JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

THIRD SERIES

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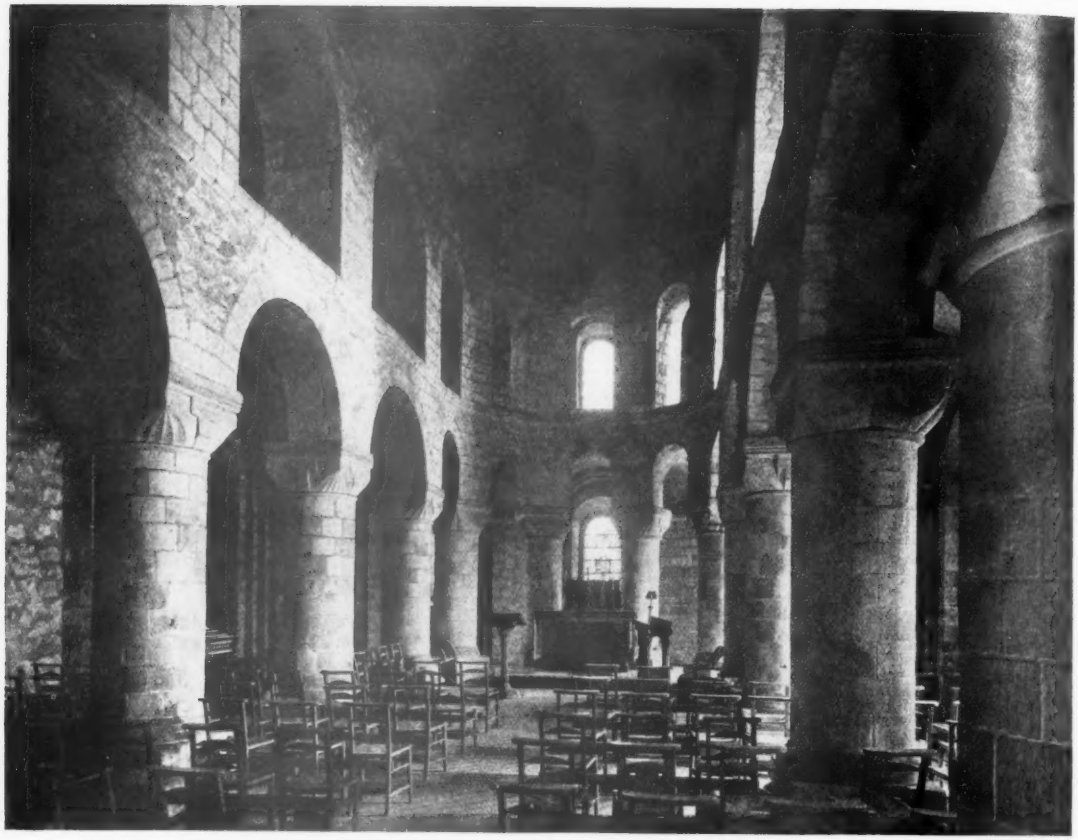


St. John's Chapel, Tower of London

(See page 866)

JOURNAL OF THE
ROYAL INSTITUTE *of* BRITISH ARCHITECTS

VOL. 42. 3RD SERIES 8 JUNE 1935 No. 15

Journal

Amongst the honours of interest to the profession and to the Institute in the King's Birthday Honours List are the knighthoods conferred on Dr. Percy Worthington, M.A., F.S.A., F.R.I.B.A., for services to architecture, and on Mr. Charles Leonard Woolley, M.A., D.Litt., Hon. A.R.I.B.A., for services to archæology. A knighthood is also conferred on Mr. Herbert Henry Humphries, C.B.E., M.Inst. C.E., City Engineer of Birmingham and President of the Town Planning Institute, on the occasion of the centenary of local government.

In the Dominion Services List, Mr. George Raymond King, F.R.A.I.A., lately Principal of the Gordon Institute of Technology, Geelong, is awarded the O.B.E., and other honours include the C.B.E. conferred on Mr. H. Chalton Bradshaw, F.R.I.B.A., Secretary of the Royal Fine Art Commission, and the O.B.E. (Civil Division) conferred on Mr. Archibald Bulloch, F.R.I.B.A., Architect to H.M. Office of Works. The O.B.E. is also conferred on Mr. William Henry Collin, Chief Housing and Town Planning Inspector, Ministry of Health.

A Special Committee, under the chairmanship of Sir Raymond Unwin, has been investigating the problems connected with the two bases on which architects are employed, namely, as salaried officials or as private practitioners. The report of the Committee, written by Sir Raymond Unwin, is published in full elsewhere in this JOURNAL, together with some notes on the constitution of the Committee. This impartial survey is an invaluable contribution to the solution of a very real problem, which in one way or another affects almost every architect in practice in this country. It would be foolish of anyone to blind himself to the fact that feeling has run high: but it is equally foolish to regard the problem as one which cannot be amicably solved. All members should read the report and do so in the spirit of impartial judgment in which it was written.

The disastrous earthquake at Quetta has given the paper in this number of the JOURNAL on the subject of earthquake-resisting design a poignant topical interest. Mr. Reginald Ford writes with the experience of the Napier earthquake behind him. That disaster made every architect in New Zealand acutely aware of the terrible responsibilities of architects who design in districts liable to shocks which can bring to the earth in a matter of seconds the most soundly built building, according to the standards of non-earthquake countries. This problem may not be one which immediately affects architects who practise above the calmer geological formations of the British Isles, but it is nevertheless one of the most serious of all the problems with which architects overseas have to deal. Quetta has shown, as Napier showed several years ago, that no area can be considered safe just because it has escaped so far. Mr. Ford states that it is definitely possible to design buildings to resist earthquake shocks of great intensity, and adds that not to do so, in any place where the geologists can show that earthquakes are possible, is to invite disaster. There are many elements in building which the architect has to design so as to be prepared for a happening which may never come to pass. The extra cost involved is regarded as a natural and inevitable insurance by all concerned. Designing for earthquakes must become, and, as experience teaches, will become a normal provision of architecture in many countries, and knowledge of earthquake-resisting construction a normal part of the architect's equipment.

The Noise Abatement Exhibition, the first promoted by the Anti-Noise League, was opened last week at the Science Museum, South Kensington, by the Prime Minister. The Exhibition, which is an important one, remains open until the end of June.

Lord Horder, the Chairman of the League, says that most people to-day are noise conscious, but do not know what is being done, or what can be done, to eliminate noise nuisance. The Exhibition supplies the answer in a simple and authoritative way, for, not being a trade show, there is no tiresome repetition of exhibits or partisan statement. There are three distinct sections—Research and Development, Transport and Machinery, and Buildings. The first section illustrates in both scientific and popular forms the practical use of laboratory tests and discoveries in many fields of activity—motor horns,

ventilation ducts, building components, personal efficiency, etc. The second section shows a road map of London marked with the intensities of street noises measured with noise meters throughout the day, and includes demonstrations with motor cycle and other silencers, quiet running electric motors, oil engines, turbines, etc., noiseless typewriters, pneumatic drills, concrete breakers and a variety of accessories.

The Buildings Section centres around a two-storey structure built in brick and concrete inside the museum and shows with demonstrable clearness the effect of several simple modifications in normal building practice, to full size scale. Small rooms from typical buildings—domestic, offices, schools, hospitals—demonstrate various practical methods of sound insulation and absorption. The R.I.B.A. exhibit, concentrating on planning points to avoid unnecessary difficulties, is described and illustrated elsewhere in this JOURNAL.

The Catalogue of the Exhibition is itself a useful document which includes authoritative articles on various aspects of noise, with one of particular importance on "The Law and Noise." This not only summarises the present position, but indicates two developments which have already commenced—the inclusion of noise abatement provisions in contracts and in tenancy agreements.

Throughout the month there are to be film displays in the Museum Section Theatre, and on 26, 27 and 28 June, during the Annual Conference of the Anti-Noise League, Dr. Kaye, Mr. H. G. Strauss, Mr. Hope Bagenal, Sir Henry Richards and Lord Horder will lecture on aspects of the noise problem.

The R.I.B.A. exhibit has been arranged under the general direction of the Science Standing Committee by Mr. Hope Bagenal [*A.*], and Mr. L. W. Thornton White [*A.*], who have been assisted by a group of junior members in the preparation of the diagrams. They deserve heartiest congratulations on their labours.

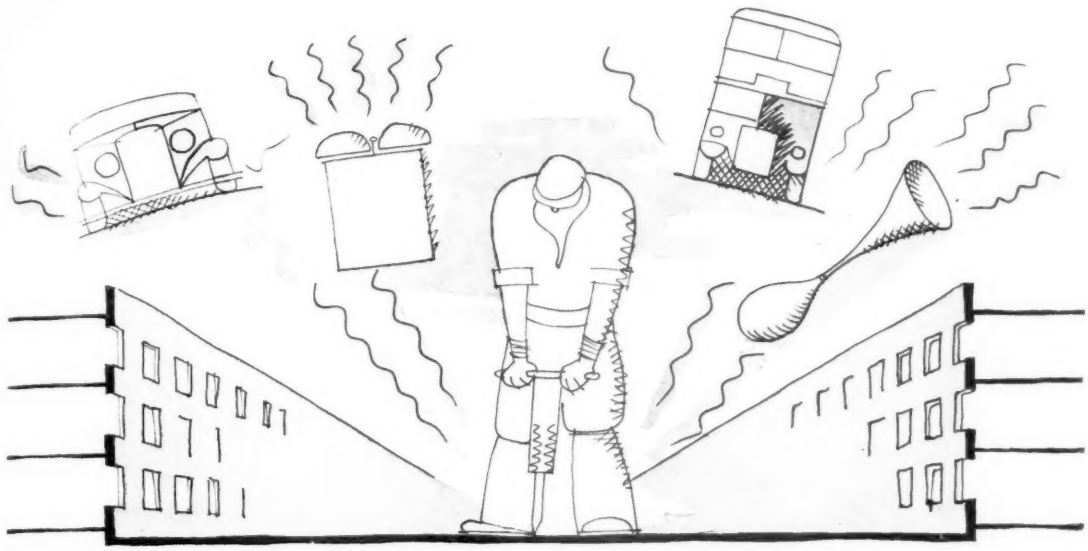
Professor Patrick Abercrombie has been appointed to the Chair of Town Planning at University College, London, in succession to Professor S. D. Adshead, who is to retire after having held the chair for 21 years. Professor Adshead was for several years Professor at Liverpool, where he was succeeded by Professor Abercrombie, who now, once again, follows him in the seemingly inevitable trek to London. The importance of the Liverpool School of Civic Design can be gauged by the position its two Professors have taken in the development of town planning in this country. In 1909, when the school was started by a gift from the late Lord Leverhulme, interest in town planning in this country was in its infancy. The start of the school, the R.I.B.A. Town Planning Conference of 1909 and Mr. John Burns's Town Planning Act of 1910 were three big events which each contributed to the success of the others and between them put town planning "on the map." Outstanding among Professor Abercrombie's particular contributions has been, perhaps, the part he has played in widening the idea of planning from the restriction, implied in all early acts, in the titles of books and in the names of the first schools, to *town* planning only. Another contribution which has received sincerest flattery from all those who edit Regional Reports is the high standard he has set in the quality of their production. Every report he has edited has been a model of arrangement, printing and map presentation which other report writers study with admiration and not a little envy that one man can never fail to maintain a level others can seldom reach.

Members wishing to attend the British Architects' Conference at Glasgow, which is being held from June 19–22, are urgently requested to send in their application forms at once, indicating the items in the programme in which they wish to take part.

The Committee in Glasgow have been working hard to provide what must be one of the most ambitious programmes that has ever been designed for an architects' conference. Glasgow is a city full of buildings and sights to capture every interest, and the Conference Committee are assuring that no opportunity will be missed. Among the outstanding tours will be one by steamboat down the Clyde, by the Kyles of Bute and round Arran, and the alternative tours through the Rob Roy country to Stirling and the Burns Country to Ayr will give visitors a chance of seeing some of the best buildings and the finest scenery in the Lowlands and Central Scotland.

The preliminary programme of the XIII International Congress of Architects is inset in this number of the JOURNAL. Reference is made in the programme to a membership form and a form for the reservation of hotel accommodation. These are not enclosed, but can be obtained, together with the inclusive rates of travel, from the Secretary of the British Section (Lt.-Col. H. P. Cart de Lafontaine [*F.*]), 11 Suffolk Street, S.W.1.

There was unfortunately no room in the last number of the JOURNAL to publish a description of the Dance held at the Institute on the evening of 20 May, which successfully concluded the series organised by the R.I.B.A. Dance Club. The dances organised by the Club last year in Conduit Street were so extremely good, in spite of everything, that an even greater degree of success was only to be expected in Portland Place, and the dances certainly gained in gaiety and popularity from their new setting. Their success was very largely due to Mrs. Slater's hard work and excellent organisation, and the thanks of the many people who enjoyed themselves at the dances are due to her.



PLANNING AGAINST NOISE

The R.I.B.A. Exhibit at the Noise Abatement Exhibition June 1935

The following pages contain an abstract of the exhibit arranged by Mr. Hope Bagenal [A.] and Mr. L. W. Thornton White [A], under the general supervision of the Science Standing Committee, at the Noise Abatement Exhibition in the Science Museum. The exhibition is open during this month.

The exhibit consists of a series of diagrams showing the public how architects can design defences against noise in various types of building. A small but important section is a series of Recommendations to Architects; these are reproduced in full below. The following members worked on the preparation of the diagrams: R. Gordon Brown [S.], Miss Y. Crane [S.], T. G. Cullen [S.], Miss Ruth Ellis [A.], F. J. Perrett [S.], F. Rutter [S.], R. H. Sheppard [S.], Miss C. Smith [S.], W. G. Sweet [S.], R. S. Tubbs [S.], C. S. White [A.], L. H. Wilson [S.].

RECOMMENDATIONS TO ARCHITECTS IN THE PLANNING OF BUILDINGS AGAINST NOISE

HOUSES SEMI-DETACHED AND IN ROWS

1. Make the party wall a real buffer between the two houses and not less than 9 inches thick at any point, including firebacks.

2. In the reception rooms add to the party wall some artificial insulation amounting to 1½ inches or 2 inches extra thickness but in addition to, and not as a substitute for, the ordinary plastering.

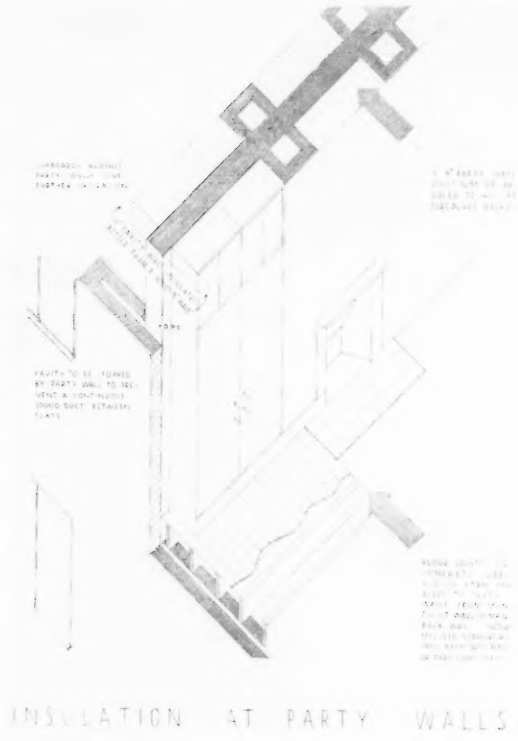
3. In the lease put a clause that wireless and gramophones shall be confined to those rooms having the extra insulation.

4. Put cupboards against party wall in bedrooms, but arrange silent catches to the cupboard doors.

5. Do not run floor joists into the party wall but parallel to it, carried on cross walls or on beams. If beams, then they must be insulated by a strip of cork, or fibre board, or lead and asbestos cloth, where they take their bearing on the party wall.

6. Carry the party wall forward to block up the air space in 11 inch hollow walls, so that the air space does not convey sound easily from one house to another, and where it touches the outer 4½ inch wall put a vertical damp-proof strip to serve both against damp and against vibration.

7. Put W.C. and bath on a separate floor unit having its own joists. Do not run joists continuously under W.C. with adjoining bedrooms, and *over* reception rooms below. Put water waste preventers on external walls, not on thin partitions.



Structural diagram giving points in party wall construction influencing sound transmission

8. Do not cut down the depth of floor joists; the cheaper the carpentry the greater the liability to noise. Put a heavy, rather than a light, door to W.C., with if possible a threshold and marginal felt on rebate.

9. Regard all mechanical equipment as a noise source and do not put it on party wall.

10. Casement windows on opposite sides of party wall must not open towards each other or it will be found that conversations can be directed out of one window into another.

Detached Private Houses

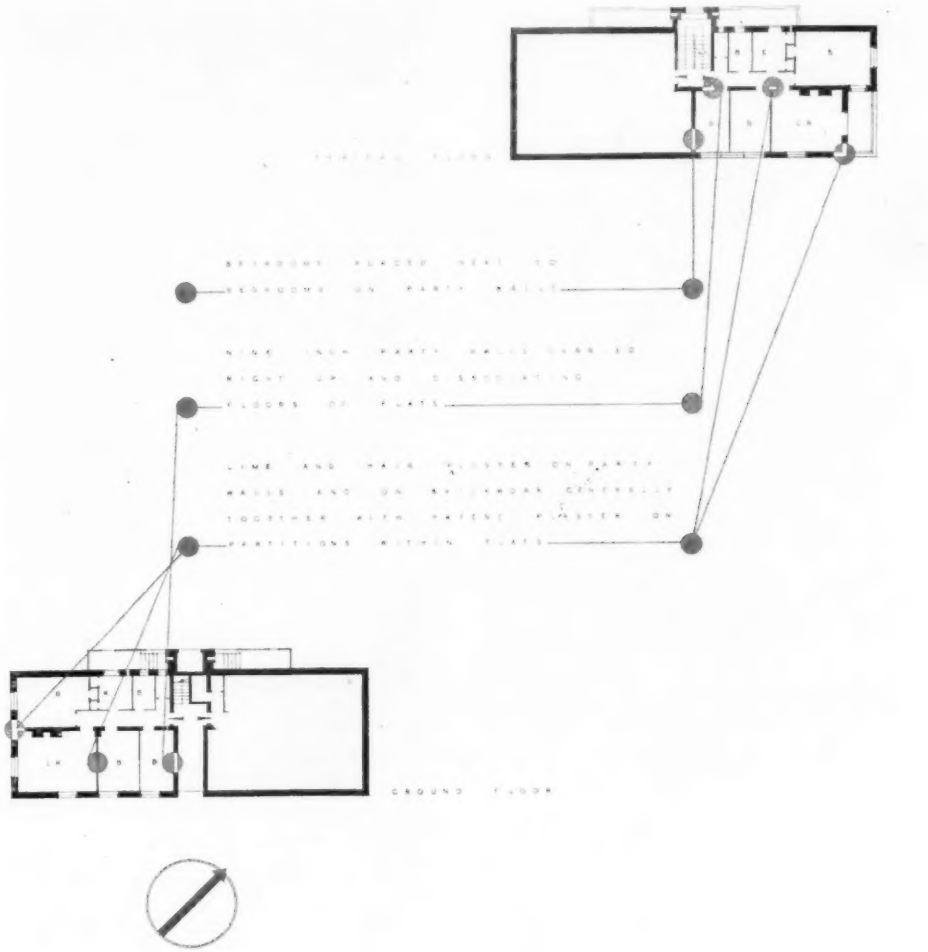
1. Find out how much importance is attached by the client to quiet conditions. If loud wireless sets, gramophones and grand pianos are taken for granted, then floors must not be left to chance but require special sound-proofing. If there are telephones in every bedroom then partitions also must be more sound proof. Wireless sets in servants' halls must be recognised as a possible noise source. Also mechanical equipment of all kinds ought to be specified as silent and to be replaced if noisy. Refrigerators, accelerator pumps, vacuum cleaners and sewing machines are all liable to cause noise nuisance.

2. It must be made clear to the client that when total cost is cut down noise risk is inevitably increased. Sound-proofing must be considered an extra cost as regards economical housing of the ordinary post-war kind. Generally speaking the better the quality of the building and the more attention to planning against noise, the less extra expense is required for sound-proofing.

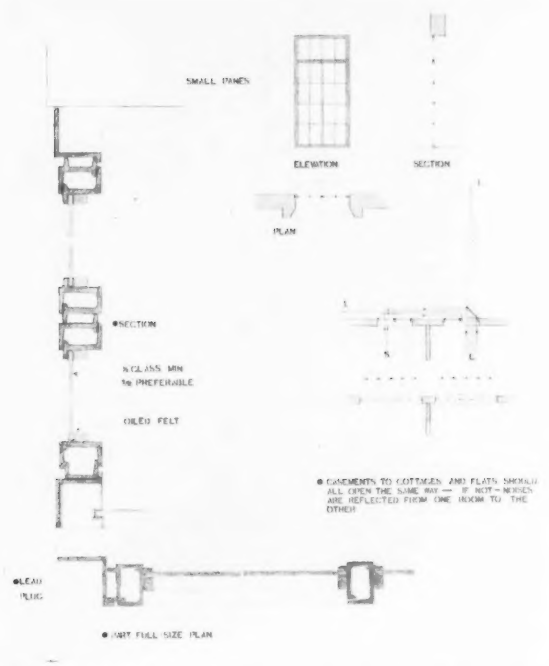
3. Modern domestic services requiring pipes, conduits and wires are all a potential source of sound transmission because they penetrate floors, walls and partitions indiscriminately. Of these services the plumbing is the most dangerous. Pipes from bathrooms, wash basins, W.C.'s may cause water hammer and cause the transmission of various domestic noises. If possible, plumbing ought to go into special brick shafts and ought not to penetrate floors. Similarly, if money is spent sound-proofing a music room, pipes from radiators must not be allowed to penetrate walls and ceiling and render the expensive sound-proofing useless.

4. In planning to $\frac{1}{8}$th scale allow room for trapped lobbies in corridors or landings where noise is anticipated. Noise is largely transmitted through doors. The placing of doors so as to avoid other doors can minimise noise

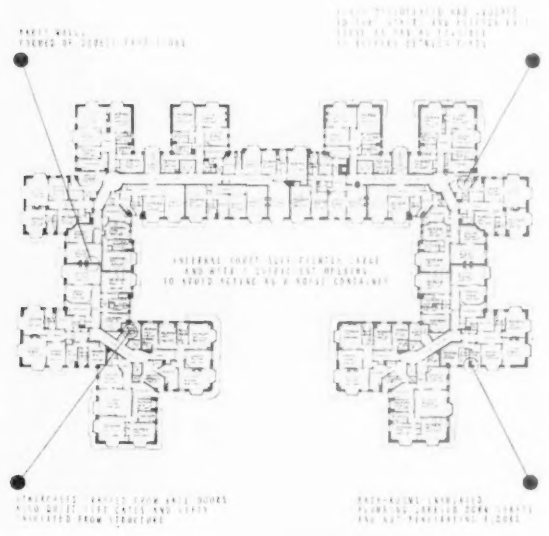
One of the pictorial diagrams illustrating the influence of the general noise level on sound-proofing



A diagram illustrating planning and structural details giving good anti-noise conditions in a flat building



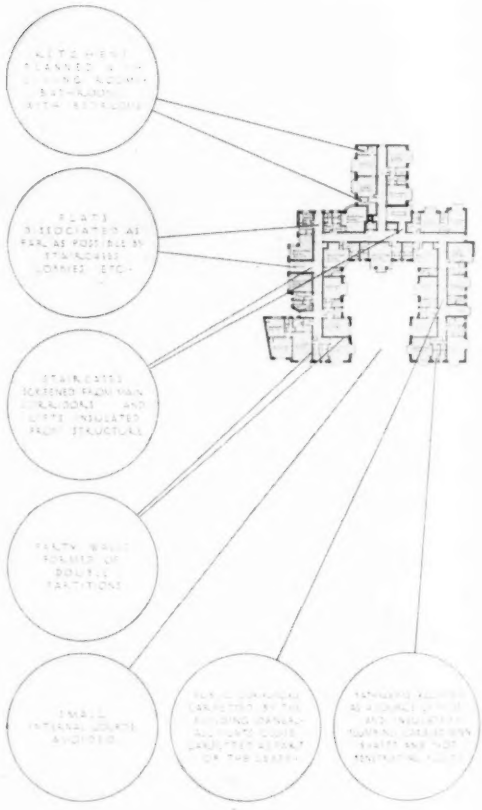
Above : Details of sound-resisting metal windows. Below and on right : Diagrams illustrating planning points brought about by consideration of noise problems in two schemes of flats by T. P. Bennett and Son [FF.]

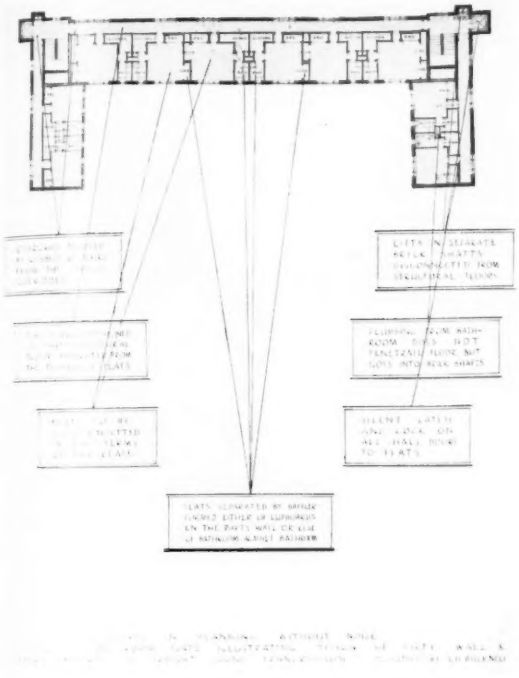


risks. W.C. and bathroom units ought to come over each other and not over living or bedrooms. Plan water waste preventers on solid walls, not on thin partitions. Leave ample thickness dimensions for floors and partition walls round possible sources of sound. There are many places on plan where the 2 inch partition may be used safely, but it cannot be used safely everywhere. Where organs and grand pianos are concerned the desirability of 9 inch brick partition walls must be recognised.

5. The use of lime mortar, rather than cement, is desirable because it gives greater discontinuity in the walls as between brick and mortar joints than does cement. Similarly lime and hair plaster is less of a sound conductor than the hard plasters and owing to its greater thickness adds mass to the partition and gives more efficient caulking.

6. Generally speaking wooden floors should not be cut down as to depth of joists. Pre-war specification in





One-roomed flats specially planned to give good anti-noise conditions. A design by L. H. Bucknell [F.]

this respect is more reliable than post-war. The type of double floor having 11 inch floor joists above and dissociated ceiling joists below is an efficient timber floor. Here again a 1 inch lime and hair ceiling below gives greater resistance to sound transmission than ½ inch gypsum plaster or the thin skim coat. Where telephones are installed in guest chambers, in which occur intimate conversations (not for the ears of other guests in adjoining rooms), the modern type of thin joisted floor is specially undesirable.

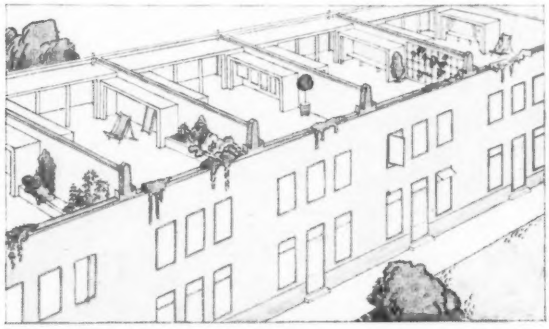
7. If joist depth and therewith general stiffness of floors is cut down for corridors, lobbies and landings, sound transmission is generally more noticeable and more difficult to cure when noticed. When solid structure already exists thick carpeting will often remove the nuisance.

8. Where adjoining rooms are to be insulated do not run floor joists continuously across the two rooms, but have separate sets of joists. W.C.'s ought to have separate floor units.

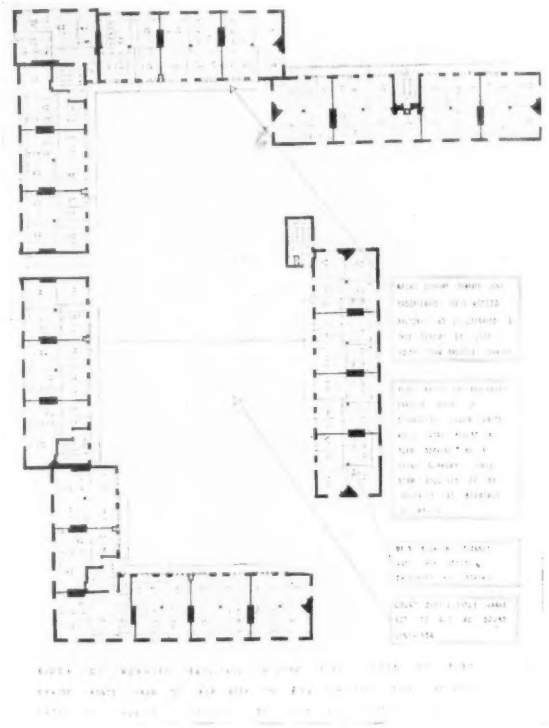
Flats

1. Plan flats so that they are dissociated by staircases or lobbies. The most satisfactory flats are three sided, giving varied aspects so that bedrooms can be placed on the quiet side. Often quiet conditions must be weighed against a sunny aspect. Avoid enclosed courts and small recessed areas, which can make a single noise into a nuisance for all rooms giving upon it.

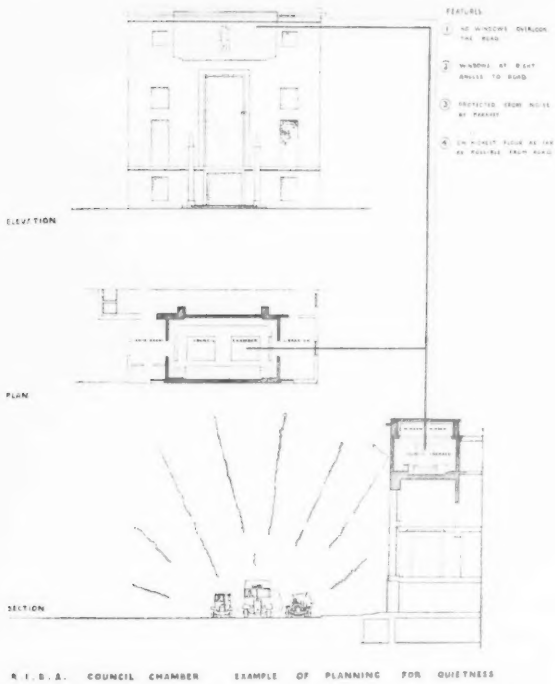
2. Plan living rooms against living rooms on party walls and similarly bedrooms against bedrooms. *This is*



Roof terraces for small children lift an inevitable source of noise above the level of windows



Anti-noise considerations in workmen's dwellings. From a scheme by Louis de Soissons [F.]

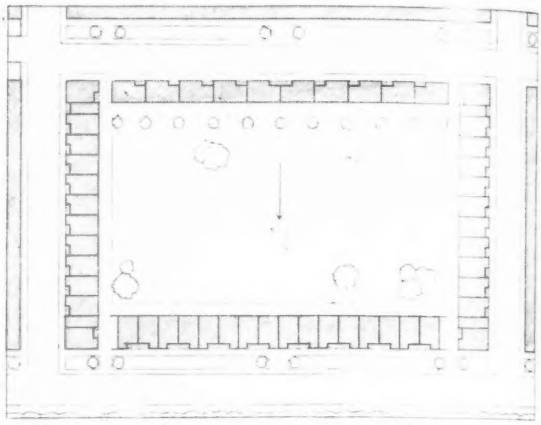


The R.I.B.A. Council Chamber as an example of planning for protection against street noises

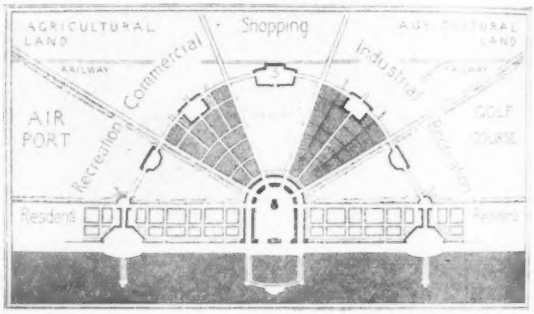
most important because a wireless set heard in an adjoining living room can be masked by conversation and by own wireless, but cannot be masked in an adjoining bedroom where silence and sleep are required.

3. Carry 9 inch brick party walls right up, dissociating floor units as between adjoining flats: floors ought then to have a bearing on external and spine walls but no bearing on party walls.

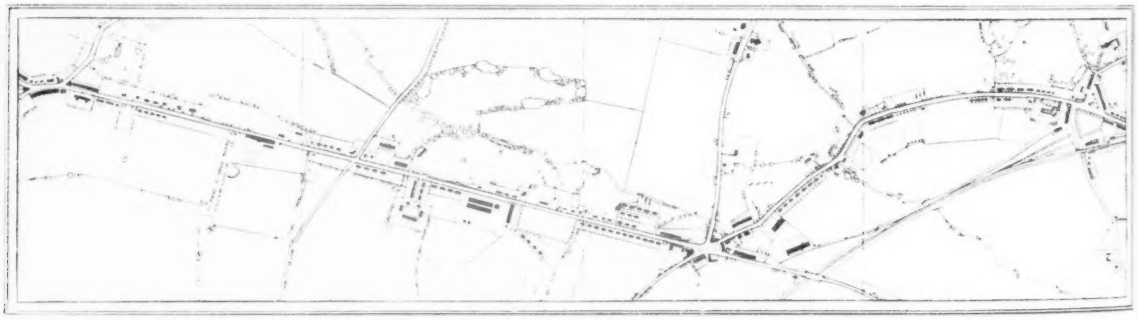
4. Plan buffers on party walls in the form of cupboards carried up to ceiling or in the form of bathroom against bathroom. This is specially important in cheap frame buildings where party walls can only consist of compara-



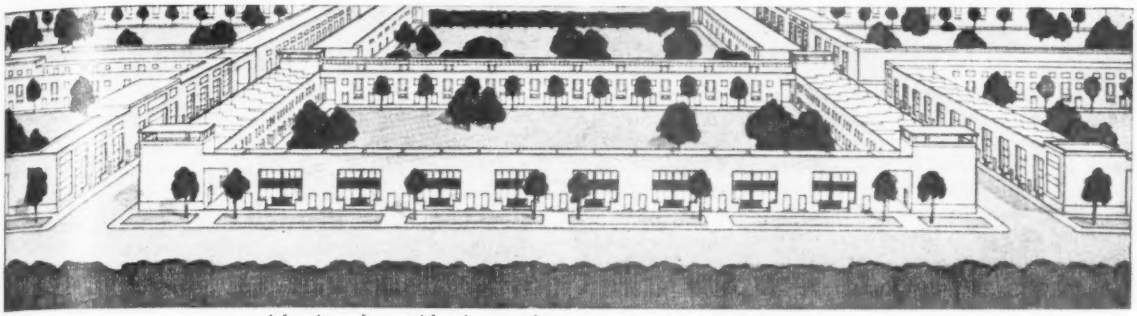
Enclosed courts, if small, cause noise nuisance; if large, provide quiet conditions. See perspective opposite



The maps above and below show contrasts in town layout. Below: Ribbon development along a main road carrying noisy night traffic. Above: A seaside town planned for quiet



Five drawings on this and the facing page illustrate the planning of residential areas to avoid noise nuisance and are taken from the publications of the Hundred New Towns Association



A housing scheme with private roof terraces and a quiet communal garden

tively light double partitions, and is a necessity in bed-sitting room flats.

5. Plan staircases trapped from public corridors or from lobbies for hall doors. Build lifts in solid brick shafts, disconnected from structural floors. Carry plumbing from bath and W.C. into brick shafts and so down without piercing structural floors.

6. Do not place balconies over bedroom windows on noisy frontages: they increase by reflection the barrage of noise upon window heads.

7. All floors to be close carpeted in the lease. Or if parquet floors are necessary for reception rooms, then allow extra thickness for a sound-proof floor under the parquet.

8. Amplification of wireless sets to be under the control of the management.

Workmen's Dwellings

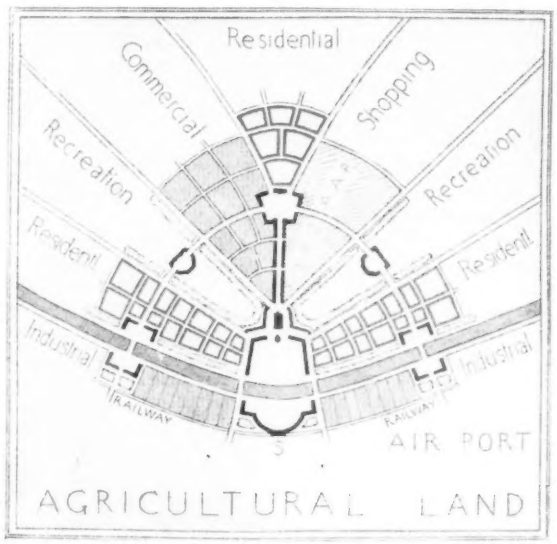
1. Large courts can serve as a shelter from street noises, but small courts and recessed areas will act as noise containers.

2. Carry 9 inch brick party walls right up, dissociating floor units as between adjoining flats. It is possible to combine the older solid brick construction for the party walls with lighter frame construction for front wall, spine wall and back wall. The floor units must then span back to front over the spine wall and have no bearing on party walls. The spine wall can be replaced by a series of stanchions and beams, but the beams must be insulated on bed at party walls.

3. Plan living rooms against living rooms on party walls and or bedrooms against bedrooms. This is important (see Flats, item 2).

4. Plan principal bedrooms away from the access balconies.

5. Put a sound insulating floor in at least the living room of every flat above ground floor.



Recreational areas planned to protect residential areas from noise

Salaried and Privately-Practising Architects

In the article entitled the Building Work of Local Authorities, published in the last number of the JOURNAL, *reference was made to two confidential memoranda which formed the basis of the campaign for the Statutory Recognition of Architects. In taking action on these memoranda, the Council decided to refer one item to a Special Committee. This item was concerned with the choice between a salaried and a privately-practising basis for the employment of architects, more especially on public building works.*

The memoranda indicated clearly that the question must be considered primarily as a matter of public policy: that is to say which basis of employment under various circumstances is the more likely to produce the better architecture. Public authorities would not concern themselves with the material interests of architects as such.

The Report printed below has been written by Sir Raymond Unwin as Chairman of the Special Committee. In addition to Sir Raymond Unwin, the Committee consisted of six members of the Institute, three of whom are in private practice and three of whom occupy official posts, and they represent both London and the country.

The Council unanimously approved the Report and issued instructions that it was first to be circulated to those members who are heads of official architectural departments for their information. It was then to be circulated to all local authorities in Great Britain and Northern Ireland, the Public Relations Committee being instructed to link it up with the President's earlier circular letter of 5 April. These two instructions have been carried out.

THE REPORT OF THE SPECIAL COMMITTEE

To the President and Council of the R.I.B.A.,—

On behalf of the Special Committee appointed to consider certain aspects of the question of Official Architecture, I have the honour as Chairman to report that the matters referred to the Committee have been carefully considered, and although the representatives of private practice and official architecture would each naturally wish to lay stress on different aspects of the question, the following represent considerations and conclusions as to which there is substantial agreement. The reference to the Committee was contained in a minute of your Council dated 12 December 1933, which read as follows:—

> The Council have had under consideration, as a point of departure, a private and confidential document on the subject of Official Architecture dated 12 July 1933.
>
> In this document four distinct elements connected with the subject are separately dealt with. They are—
>
> (*a*) Private practice carried on by a whole-time officially employed architect.
>
> (*b*) Architectural work entrusted by a Public Authority to a person who is not a trained architect.
>
> (*c*) Architectural work carried out by an unnamed assistant for an unqualified official who takes the credit for the work.
>
> (*d*) Government or official work entrusted to a fully qualified member of the R.I.B.A. on a salary basis.

The Committee were informed that the situation arising under the last paragraph (*d*) of the minute was the one which alone they were asked to consider.

1. The records show that during its 100 years of existence the Institute has conscientiously tried to carry out the duty entrusted to it in its original Charter, viz., the advancement of the art of architecture, and in doing so, not to discriminate between the various sections of its members. Architects holding official posts have been admitted to the highest positions within the Institute and have received the highest honours which it is within the power of the Institute to bestow.

The Committee further recognise that members of the Royal Institute of British Architects are regarded with the same consideration whether they occupy official positions or are in private practice. It is the desire of the Committee and of the Institute to do all in their power to improve the status and conditions of employment of all properly qualified architects, whether remunerated by salary or commission, whether occupying senior or junior positions. The Committee wish emphatically to endorse what they believe to be the Council's policy, namely, to ensure that proper recognition is given to the official or salaried architect, and that he shall occupy that position to which his training, qualifications and work entitle him.

This policy has been endorsed by successive Presidents in their inaugural addresses and on numerous other occasions; and the Committee are impressed with the desirability of dispelling any erroneous impression that the Institute is not mindful of the welfare of the considerable section of its members who are not in private practice.

2. Architecture has the purpose of satisfying human needs: it is an art based on sciences and administered as a business. Fortunate individuals may be endowed in sufficient degree with all the varied faculties needed to give great efficiency in this complex activity. This can hardly be expected as the common lot of men; for the faculties needed differ widely in their character; and though each may be capable of training to some extent, in many cases concentration on one may well not tend to bring proficiency in another. A practising architect may meet this difficulty either through partnership or by employing very good assistants. The official architect can only meet it by the employment of assistants, or by the calling in of practising architects as consultants or collaborators.

So far as architecture is an art, and it is essentially a matter of planning and design, it must depend for success on the definite personal contribution of the planner and designer. It is in the interests of architecture that those possessing in a high degree the not too common faculty of design should be known, and their works associated with them by name.

3. The first principle to be laid down would seem to be that in all cases where the nominal architect, whether an official or in private practice, is mainly responsible for the business administration or the structural science, and where the design, as apart from these, depends on some subordinate or assistant architect, the recognised etiquette of the profession should be that the name of the architect responsible for the design is associated with the work.

4. The development of Government and Local Government activities and their extension to new and wider fields, and the development of business firms extending over wide areas and having many branches, all tend to create new conditions. In such cases there is a great deal of architectural work, maintenance of buildings, alterations, the erection of new branch buildings especially adapted to a technique which has been developed by long experience, and so forth, which can most conveniently be carried out by men specialising in that work, retained for it, remunerated by salary and becoming, in fact, more or less completely officials.

On the other hand, all these conditions tend to emphasise the administrative, scientific and constructional aspects of architecture; and in many cases to relegate high quality of design and imaginative planning to a subordinate position. Those appointing chief architects for these purposes are more likely to be influenced by high administrative and executive qualities than by outstanding designing ability. In any case such chief architects must have their time and attention largely occupied by routine duties; and they can seldom be in the position to get free from such duties to a sufficient extent to be able themselves to undertake the planning and designing of any extensive buildings. Moreover, the position of subordination of an official to the authorities or directors whom he serves, while having the advantage of securing to them a ready following and appreciation on his part of all their requirements on the administrative and business aspects, leaves the architect with insufficient authority to impress upon them what is good designing; a matter in which the public are interested and the authorities and directors are hardly in a position to judge; and as to which some independent architect, who can meet them on equal terms and so speak with greater freedom and authority, may be better situated.

These considerations seem to point to dangers in the undue development of official architecture. On the other hand, the natural pride of the official architect in his work, and the desire, which he must frequently feel, himself to essay the design of the chief buildings called for, are legitimate considerations which not only affect the chief architect, but affect also his assistants who will naturally wish to have the opportunity to work upon the best buildings that are called for.

5. As regards the system of remunerating architects on a salary basis whether by public bodies or by commercial organisations, the Committee see no reason to take exception to this basis, provided that abuses are avoided, such, for example, as are referred to in paragraphs (*b*) and (*c*) of the minute recited above, and the architect is adequately remunerated and is given credit as designer for the work for which he is personally responsible.

6. No doubt architects in private practice, especially in provincial towns, frequently feel aggrieved, when, in hard times, their own practice dwindles, while their officially employed confrère does not share in the loss which the depression causes. There can hardly be any architect, official or otherwise, who would not be sympathetic under such circumstances; and if the official architect were dealing with more work than should be dealt with by one man, a grievance would undoubtedly exist.

Such a situation, if abnormal in duration or extent, would clearly be an abuse of the system of official employment; such abuse is not, however, a valid ground on which to condemn the system in principle.

On the other hand, it must be borne in mind that the remuneration of an official or salaried architect is generally fixed at a comparatively low figure on account of the advantages he enjoys as regards continuity and regularity of employment, and possible also as regards pension rights. In normal times when the private practitioner is well occupied the official architect doing the same amount of work would usually receive very much less remuneration than the net income of his independent colleague. The situation must be judged on a broad view and not solely in reference to the hardships endured on one side in bad times. Architects at some stage in their career make the choice between official employment and private practice, after weighing up the advantages and disadvantages of each system, and having regard to their own circumstances and personal inclinations.

7. The practising architect is naturally impressed with that aspect of the problem which is represented by his finding what appears to be a favoured competitor to whom a large practice is secured by his official position. As regards such rival claims for commissions, if there were no official architects, it is reasonable to suppose that the same men would be added to the number seeking a share of the same work in private practice. Probably, therefore, this aspect of the matter is not one of the most important. That a constant stream of work of growing importance should, however, be securely directed to be carried out by architects who may be chosen mainly on account of administrative qualifications by local authorities who are thinking mainly in terms of cost, and are less interested in good design, may well prove a danger to architecture. It may also become an ultimate source of legitimate grievance to those architects who may feel that there are equally well qualified men and better designers who do not get their share of the existing opportunities for the exercise of their faculties.

8. Here then is the problem; and the above considerations seem to suggest that solutions are likely to be found

(*a*) by directing attention first to the need for securing the best possible architecture; with a view mainly to securing that important buildings shall be entrusted to the best designers. The R.I.B.A. have encouraged and perfected the system of competition as a means of selecting the architects, and the more general adoption of this method would do much to meet the difficulties;

(*b*) by recognising that in the great complexities of modern conditions, requirements, materials and structural progress, there is ample place in the architects' profession for men who, having a sufficient range of knowledge over all the aspects of architecture, are nevertheless specially qualified only in one or two, either as designers, constructors, or administrators; and that to expect in the majority of cases that all these faculties will be united in one person in supreme degree is unreasonable;

(*c*) by appreciating that there may be a tendency for designers to come to the fore in private practice, while in official work there is a greater risk that administrators and constructors may obtain the chief posts.

The conditions seem to point to the further suggestions that the practising architect should be more ready to ally his designing faculties with the administrative skill and special experience of official architects of special administrative ability, in some form of co-operation; that official architects should realise that there may be men better qualified than themselves in the matter of design, and be more ready to seek their help and co-operation; that they should recognise as architects that the first duty of an official architect is to secure good buildings; and that the greater the importance or prominence of the building, either in character or location, the more necessary it is that the supreme quality of design should be present to harmonise and crown all other qualities.

The conditions of difficulty obviously tell with greater force in regard to the small official departments of minor authorities and of lesser commercial enterprises. The difficulties due to difference of faculty can be met, and are met, much more thoroughly in some of the larger departments, and particularly in H.M. Office of Works, where the custom has for some time been prevalent of giving definite recognition to the architect responsible for any particular building, the design for which bears his name.

9. The following conclusions, therefore, would seem to emerge:—

(1) It is recognised that for all routine and technical matters, in Government, County and Municipal Offices, the official architect is generally deemed best fitted to carry out these duties.

(2) Where, however, a new building of civic importance is required, or where there is scope for fresh ideas of design leading to an advance in architectural planning, the outside architect is more likely to be successful and to contribute to such an advance than one who is cumbered about with much serving; and as to such cases the lead given by the Office of Works, both in London and in Edinburgh, in seeking outside assistance is heartily welcomed; as also is the recent announcement of the L.C.C. that they propose to entrust to private architects some of their housing work.

(3) To draw the line between what is routine work and what is not may be difficult; and here reliance must be placed on (*a*) the official architect himself in advising his authority; and (*b*) on the development of public taste and that of the authorities themselves, so that they shall demand that fresh brains shall be invited to solve problems the solutions of which hitherto may have become stereotyped and the continuance of which would not be for the advancement of architecture.

(4) In the interest of good architecture it is important that the architect responsible for any design should be known and his work recognised, and that his proper status should be secured.

RAYMOND UNWIN,

Chairman, Special Committee on Official Architecture.

NORMAN SURVIVALS IN LONDON*

PARTS OF THE R.I.B.A. PRIZE ESSAY, 1935, BY DANIEL ROTH, A.R.I.B.A.

THE TOWER OF LONDON AND THE LONDON BUILDINGS OF THE MILITARY ORDERS

The Tower of London

"*On the east stand the Palatine tower, a fortress of great size and strength, the court and walls of which are erected upon a very deep foundation, the mortar used in the building being tempered with the blood of beasts.*"—Fitz Stephen.

"*. . . some have written (but of none assured ground) that Julius Cæsar, the first conqueror of the Britons, was the original author and founder, as well thereof as also of many other towers, castles, and great buildings within this realm; but (as I have already before noted) Cæsar remained not here so long, nor had he in his head any such matter, but only to dispatch a conquest of this barbarous country, and to proceed to greater matters . . . and therefore leaving this, and proceeding to more grounded authority I find in a fair register book, containing the acts of the Bishops of Rochester, set down by Edmond de Hadenham, that William I, surnamed Conqueror, built the Tower of London; to wit, the great white and square tower there, about the year of Christ 1078, appointing Gundulph, then Bishop of Rochester, to be principal surveyor and overseer of that work.*"—Stowe.

"*The White Tower is a large, square irregular Building, topped with four Watch-Towers, not uniform . . . This Building consists of three very lofty Stories, under which are most spacious and commodious Vaults. . . . The Roof is flat, and covered with lead, affording an extensive and delightful Prospect.*"—Maitland.

WILLIAM THE CONQUEROR found the city not only strongly fortified by the Roman wall, but also well organised internally and wealthy, and it is recorded that instead of boldly attacking as he passed up the river, he sailed past the town and after several land encounters in the district, approached the gates with gestures of peace and offered the citizens terms. With London thus won to his support his security in this country was assured, and his charters, so often quoted, giving the city the privilege of self-government and protecting it from allegiance to anybody but the king, strengthened that position. It was probably with the double intention of overawing the citizens and of protecting himself against a concerted rising by them, that he built his castle against the wall (on the inner side), and at the same time the new tower must be recognised as an additional defence of the city. The old legend of Roman foundation cannot be so lightly discarded as Stowe suggests, for modern writers have declared that a fort, and possibly a watch tower, occupied Tower Hill in Roman times, and moreover the existing Roman wall was incorporated by Gundulph in the Tower defences, and the later additions also used Roman foundations. According to Maitland "this first Fortress or great square Tower, stands upon the Spot where the second Bulwark once stood, in the East Part of the Wall from the Thames."

Mr. A. W. Clapham, discussing the growth of the Tower, has shown that the line of the eastern wall of the city passes through the Bowyer Tower and the Wardrobe Tower, where, changing its direction slightly (and remains have indicated that change) it strikes exactly the Lantern Tower. The bastions of the wall shown on Ogilby's map of London of 1676 are roughly 200 feet apart, and this is also the distance between the Wardrobe and the Lantern Towers. The same spacing on the south would set out the Wakefield, Bell and Middle Towers, suggesting the line of the southern wall of the city, continuing along Lower Thames Street. Ogilby's spacing of the bastions may be inaccurate, as his plan of the Tower is inaccurate, but within a few feet that cannot affect the argument, and it can be observed that the line of the enceinte is inflected at the Bowyer and Lantern Towers in a curious way, most readily explained by

* The complete essay is too long to publish in the JOURNAL, particularly as it includes a very large number of photographs and drawings essential to a full understanding of the text. In order to represent the essay as fairly as possible it has been thought better to print two of its sections complete rather than to print an abbreviated edition of the whole. In addition to an introduction and a chapter on Norman London the full essay, which can be seen in the Library, contains similar descriptions to those published, of Barking Abbey, Westminster Abbey, St. Mary-le-Bow, St. Bartholemew's, Smithfield, Waltham Abbey and East Ham Church.

accepting the theory of Roman bastions at these points. Early plans of the Tower incorporate a gateway called Coldharbour adjoining the south-west angle of the Keep and a wall between that gateway and the Wakefield Tower. So it seems clear that the Keep stood near the old wall with a bailey to the south formed by the east and south walls of the city and the wall between the Wakefield Tower and Coldharbour. This conforms with the typical Norman castle plan, in which the keep stands to one side of the bailey, the concentric plan with the Keep in the centre being a much later type (Fig. 1). On a plan of 1721 a building is shown exactly occupying the space between the east side of the Keep and the Roman wall. There can be no question that the Tower was an innovation, for it is the first recorded castle in

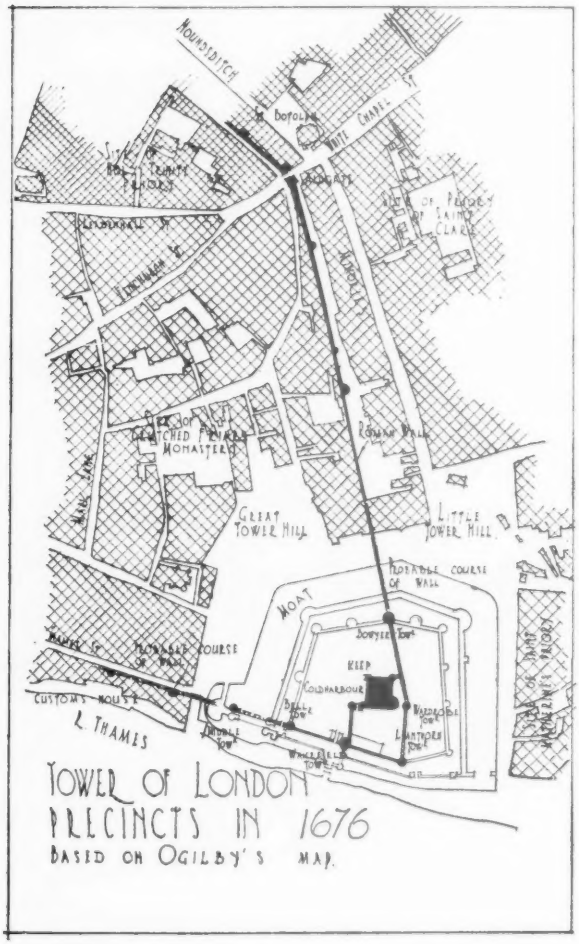


FIG. 1

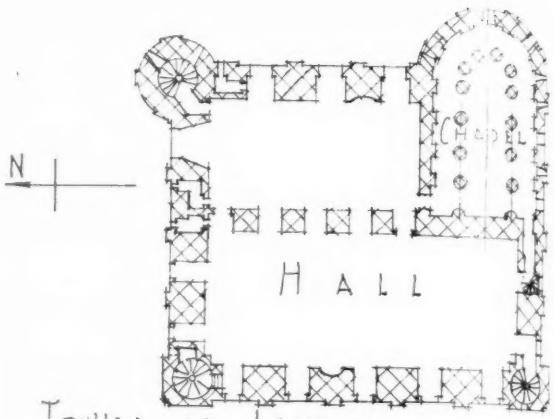


FIG. 2

England with a stone Keep and no traces have been found of any earthworks, although earthwork defences and wooden Keeps are known to have been built in other places by the Conqueror. The first enceinte, apart from the existing wall, was undoubtedly a wooden stockade and probably it was the use of the city wall in this case that inspired the use of stone curtain walls in later examples.

The Keep, now known as the White Tower, is standing to-day in fairly good condition, but bearing unmistakable marks of ill treatment. The first construction of the Tower must have been rather poor, for it is recorded that repairs were necessary as early as 1090, and again in the reigns of Henry II and Henry III, so we may allow that the later restorers were forced into action by the weakness of the structure, although we deplore their lack of respect for the antiquity of their charge. The outside has been redressed with Portland stone, the windows have been enlarged, and the entrance has been moved several times to different positions, whilst internally walls have been opened and openings have been closed, a huge brick vault has been inserted in the basement, and other mutilations have been tolerated. The original entrance was at first floor level, its position now indicated by a large window, so that with the access stair removed it would be difficult to enter. Two small recesses in the jambs of the entrance probably housed the hoisting gear of the stair. The plan of the Keep is roughly square, with a circular projection on the east side to accommodate the apse of the chapel. This arrangement of the chapel is not typical, but other similar cases are known, notably Colchester Castle, whilst Rochester Castle, which probably came under Gundulph's influence, will stand comparison (Fig. 2). It will be noticed that in each case the area of the Tower is divided by a cross wall providing two

large chambers on each floor, and on the chapel level, usually the second and principal floor, one of these chambers would be the banqueting hall. The main stair has a similar relation to the chapel in each case. An interesting feature of these spiral stairs is that on rising the newel is to the right hand, so that an invader would be at a disadvantage in using his weapons, and a single man could hold an army of attackers at bay.

A survey of one of the chambers of the principal floor at the Tower, by C. Lempriere in 1721, reveals what was probably the original condition (Fig. 4). The chapel appears to have been completely isolated at this level and there was only one opening in the main dividing wall. The windows still retained their centre mullions, although one had already been considerably enlarged, and the floor above was carried by a single row of stout posts. To-day every one of the windows has been enlarged, the recesses in the main division have been pushed through the wall forming open arches, the chapel stair wall has been removed, a new opening is made in the north wall of the chapel, and the floor above is carried by two rows of posts. Some of the fireplaces can still be seen, where they are not walled up, and the chapel stair is now sealed below the first floor. It would be interesting to follow the course of the flues, which are large enough to contain a man, for at the top floor a gallery about 4 feet wide is formed all round the building in the thickness of the wall, and the flues must be bent round it. Probably a single flue serves two fireplaces.

At the second floor level the external wall is 10 feet thick, and contains various chambers and recesses. The small recesses in the windows may have been plate cupboards or wine cupboards, but their exact use is uncertain; the curious dog-legged chambers in the north wall were toilets, of which details are shown in Fig. 3. The small parapet wall probably carried a wooden seat, and the space behind it was formed into a chute passing through the wall. There are four of these chambers, one in the wall of the S.W. stair being a very small and inconvenient place probably intended for the menials. There are similar chambers in the walls at Colchester and Rochester.

Only one of the original windows remains (see Fig. 3), the mullion being formed by a short column, whilst the adjoining window in which a mullion of ashlar has been inserted probably represents the condition of the windows shown on Lempriere's drawings. This alteration must have been made when the windows were glazed, very likely before Wren's time, for the original windows did not contain glass and were probably covered with horn or oiled fabric. The final mutilation is shown on a drawing of 1753, by W. James, setting out the proposed alterations, so we must exonerate Wren, who died in 1723, from this crime. The chapel windows are imitation Norman and may, therefore, be assumed to occupy the original openings. Before passing to a consideration of the chapel, which is undoubtedly the most interesting

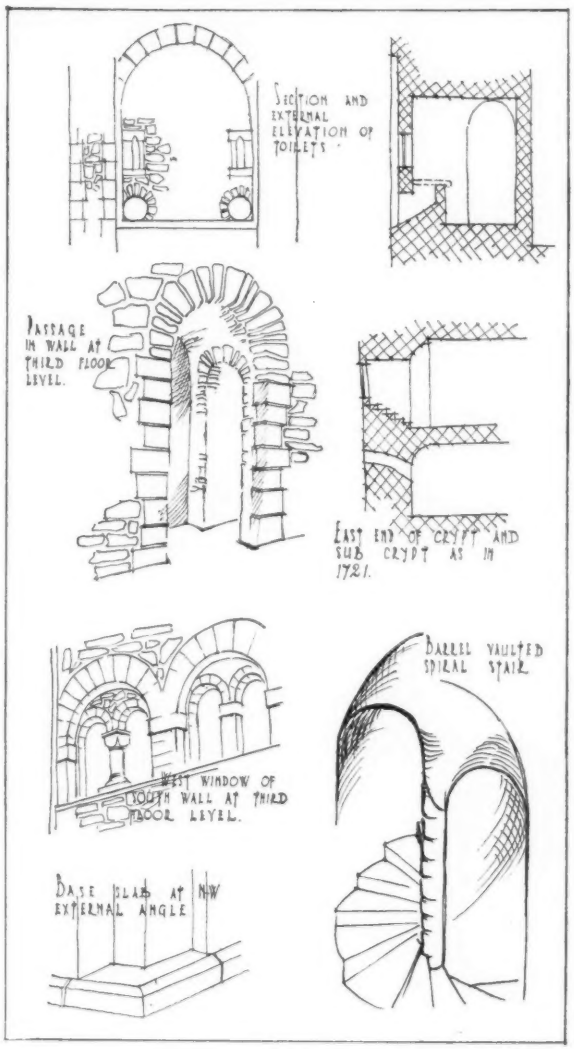

SECTION AND EXTERNAL ELEVATION OF TOILETS
PASSAGE IN WALL AT THIRD FLOOR LEVEL.
EAST END OF CRYPT AND SUB CRYPT AS IN 1721.
WEST WINDOW OF NORTH WALL AT THIRD FLOOR LEVEL.
BARREL VAULTED SPIRAL STAIR
BASE SLAB AT NW EXTERNAL ANGLE

FIG. 3

part of the Tower the masonry calls for some comment. On the lower floors it has been much repaired, but on the top floor the original masonry is still doing service. In the outer wall, containing the corridor, the window recesses are about 15 feet high and 7 feet wide, the rubble wall arches are well made with very wide joints, the stones varying from 1½ inches to 6 inches thick, and the recess is roofed by a barrel vault of rubble. This is crossed by the corridor, similarly constructed but not so high. The jambs up to the springing are of squared Caen stone of varying sizes with joints about 1 inch

thick, with an occasional Portland stone replacement. The walls are of rubble with very wide joints, sometimes as much as 4 or 5 inches. The rubble barrel vaults over the spiral staircases testify to the skill of the Norman masons (Fig. 3).

The model here illustrated (Fig. 5) represents the Keep as it was in the year 1597, before any of the external mutilation had occurred. There are actually four turrets, two being absent from the model because the south side is shown in section.

The chapel of St. John occupies a position on the south side of the second floor, with an open gallery at the level above and a crypt and sub-crypt at the two levels below

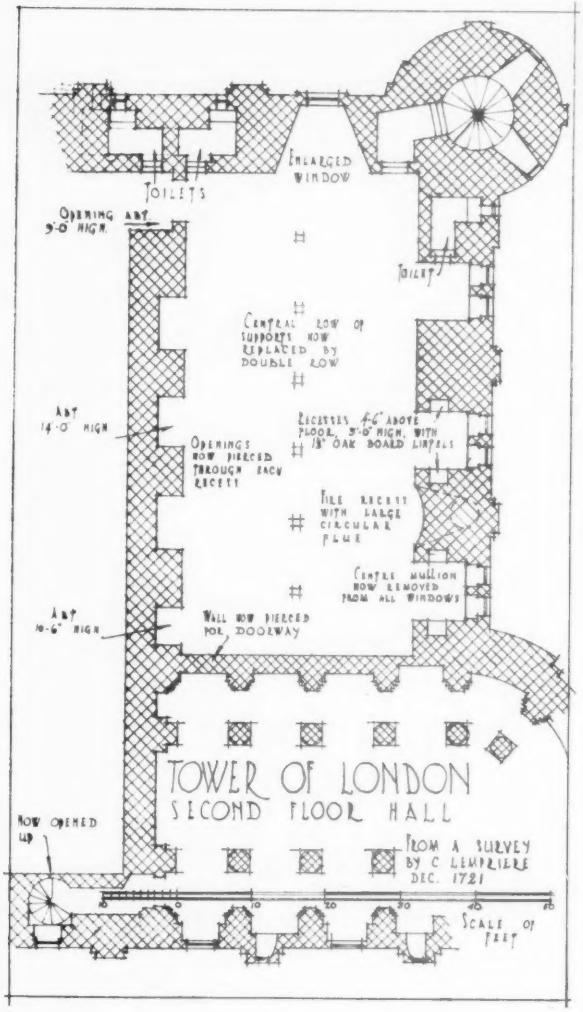
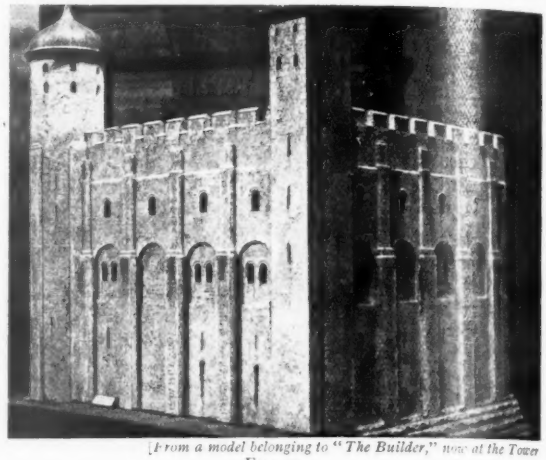

TOILETS
ENLARGED WINDOW
OPENING ABT 5'-0" HIGH
TOILET
CENTRAL ROW OF SUPPORTS NOW REPLACED BY DOUBLE ROW
ABT 14'-0" HIGH
OPENINGS NOW PIERCED THROUGH EACH RECESS
RECESSES 4'-6" ABOVE FLOOR, 3'-0" HIGH, WITH 18" OAK BOARD LINTELS
FILL RECESS WITH LARGE CIRCULAR FLUE
CENTRE MULLION NOW REMOVED FROM ALL WINDOWS
ABT 10'-6" HIGH
WALL NOW PIERCED FOR DOORWAY
TOWER OF LONDON
SECOND FLOOR HALL
NOW OPENED UP
FROM A SURVEY BY C LEMPRIERE DEC. 1721
SCALE OF FEET

FIG. 4



[From a model belonging to "The Builder," now at the Tower

FIG. 5

(Fig. 7). It possesses three features which have brought it into every text book on architecture, namely (a) an apsidal east end, (b) a barrel-vaulted nave (*frontispiece*), and (c) a vaulted aisle and ambulatory, and furthermore it was probably the first building in this country to combine those features. Owing to its small size it is the most complete structure of the early Norman period, for were its nave greater than 13 feet span we would in all probability have been deprived of its barrel vault. The aisle is formed by a continuous arcade of circular piers carrying the floor and arcade of the gallery, the aisle being cross-vaulted and the gallery barrel-vaulted (Fig. 7). The vaulting compartments of the aisle are not square and the transverse arches are stilted to give the necessary height, thus forming a slightly twisted groin, but in the ambulatory, where owing to the tapering plan of the vault the difference in span of the arches is very pronounced, the exaggerated stilting of the smaller arches has produced a very marked and unpleasant twist. The responds of the vault are formed by square offsets, as at Bow Church and Westminster, and in the apse these square faces are not curved to the radius of the apse, but are kept flat.

The spiral stair to the west of the chapel appears to have been rebuilt and enlarged in comparatively recent times, probably when the wall was opened. Originally, if Lempriere's survey is correct, it served only the chapel and basement and may have been devised as a decoy for invaders. The north door of the chapel is also fairly recent, and has been made to facilitate the circulation of visitors. It will be observed that the buttresses are not functional, for not only are the walls so substantial as to require no buttresses but in the one place where vaulting is used, which might suggest the need for a buttress, the buttresses are not placed at the vault abutments and are actually pierced by windows. The corridor in the third floor wall gives access to the gallery at two points and is thus a continuous circuit of the Tower.

The crypt and sub-crypt have no connection with the chapel beyond an accidental geographical one. Their function was a grim feature of every early fortress, for the prelate architect of the Tower saw nothing inconsistent in placing his miserable dungeons immediately under the chapel. The only light admitted to the sub-crypt was by a small circular window shown in the 1721 survey (Fig. 3), and one shudders at the knowledge that in 1255 ninety-one Jews were imprisoned here, awaiting trial for a false charge of "ritual murder." The crypt is not quite so miserable, for it had the advantage of four windows, but we cannot conceal our horror of the small cell built into the wall. The windows have all been altered, and it is clear from the plan that the recesses were much narrower, and from the section (Fig. 6) that they were much lower than they are to-day. The floor of the apse window has been cut away and the window enlarged to throw a little light into the sub-crypt. Both chambers have barrel vaults, apparently restored in concrete. If they are concrete—and they appear unmistakably so—they are fairly old, for in the *Archæologia* of 1811 I find the following passage:—

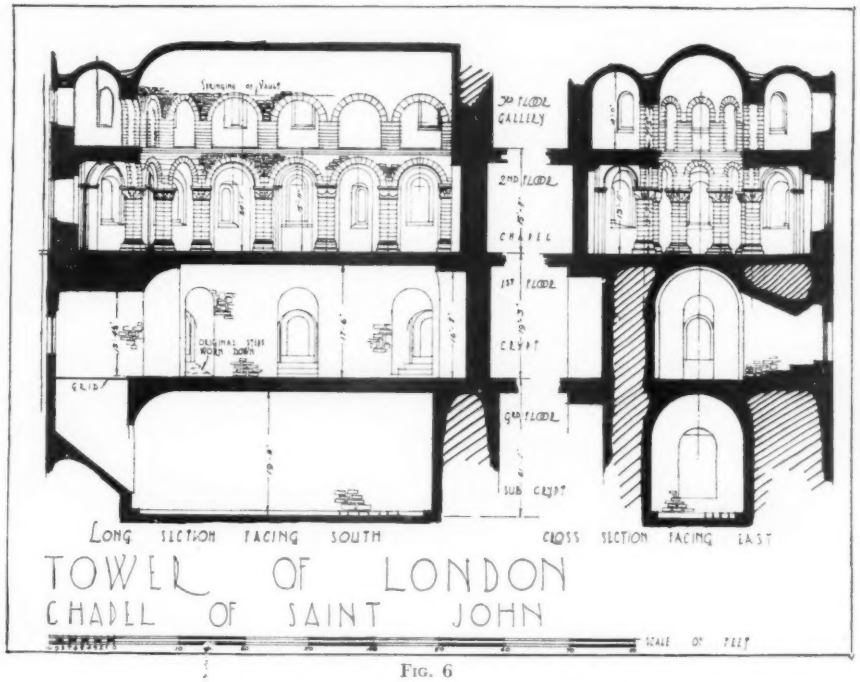


FIG. 6

> "Under the Chapel of the White Tower at London, a room has the upper part covered with plain cylindrical vaulting, in which the boards of the centering are strongly marked . . . a coat of coarse mortar appears to have been laid over the boards, to make a uniform surface for turning the arch upon."

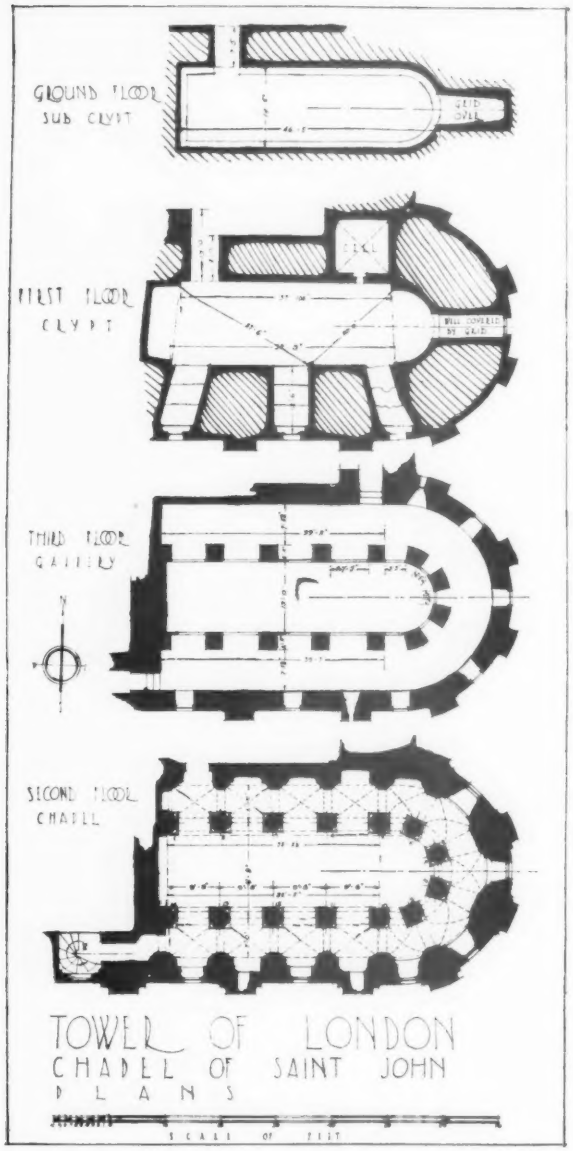
The author of this passage evidently thought that they were stone vaults, and failing a close inspection we cannot definitely refuse this view, but in no other case is similar evidence of the centering to be seen.

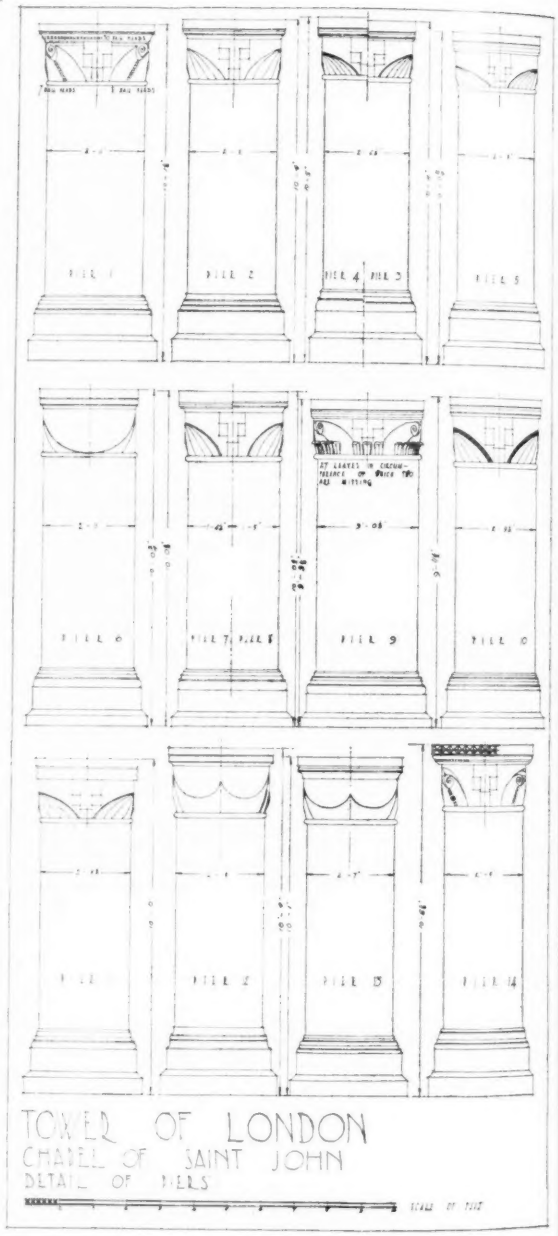
The construction of the chapel has no complications. The piers need no foundation, for they are safely carried by the wall below, the thickness of which is sufficient to receive the whole chapel aisle. The vaults are of rubble, covered with a rough plaster, and the rubble walls appear also to have been plastered, the plaster used having the same appearance as the mortar. I shall not attempt to suggest the composition of the mortar, but it appears to contain a high percentage of sand and occasionally small particles of flint. The piers are built up of ashlar blocks about 10 inches square with wide joints, and the arches, gallery pier facings, the whole of the apse up to the vault, and the responds and window dressing are also of ashlar. The general masonry of the walls and the spandrils is rubble, the ashlar throughout being of Caen stone with wide joints, and the rubble of several stones, including flint and flagstone, varying in size from 3 inches to about 1 foot 6 inches. The aisle vault is cracked, but no further movement has been noticed since 1918, when the gallery was closed to the public, and one vault of the apse is in concrete, where in the eighteenth century a spiral stair was inserted to connect the two levels. Some of the bases are of a dark stone, and a few stones of slightly purple colour are found here and there in the ashlar. All the bases are jointed but the caps, with one exception, are of a single stone.

The fourteen piers of the chapel are worth careful study (Fig. 8). All are circular and all stand on a double square base with a plain chamfer, but beyond that no two are exactly similar even where they conform to similar types. The diameters vary from 2 feet 6½ inches to 3 feet 0½ inch, and the total height, from floor to springing, varies between 9 feet 9½ inches and 10 feet 5½ inches; each has a different base and abacus moulding, only two mouldings being duplicated out of the twenty-eight. Observing the capitals, we cannot help recognising a parallel between pier 9 and the corinthian capital, as a result of which the curious T ornament which occurs on eleven of the caps, becomes connected remotely with the

To left: FIG. 7

Below: FIG. 8





flower ornament of the corinthian cap. Comparison with a capital from Como suggests an early form of this ornament, possibly derived from a latin cross, and Rivoira illustrates another example in which a small cross replaces the abacus flower in a quasi corinthian cap. It must not be forgotten that a good deal of Norman culture was disseminated by the monastery of Bec, which was largely recruited from Lombardy and the south of

France, where classic influence was strong, and Gundulph was himself a monk of Bec.

All the capitals are solutions of a very old problem which has appeared in different disguises throughout architectural history—how to connect a circular form to a square one. The solution offered by pier 6 (the only jointed capital), which approaches most nearly to the cushion type, is essentially an inverse of the pendentive, which solved the same problem in the case of the circular dome on a square chamber, and piers 12 and 13 are modifications of it. In every other case the method has been to convert the square to an octagon, the octagon being sufficiently circular to be considered a solution. The general method of making this conversion is to cut a triangular panel from each corner, but two cases where a voluted lobe is placed at the corner must be regarded as modifications of pier 9, for the volute is clearly of classic origin. Later forms of this lobe treatment, not necessarily influenced by the Tower example, are seen at the Temple church and Canterbury Cathedral, and by comparing the detail of the volutes with the Canterbury cap we can recognise at the Tower the germ of the thirteenth-century stiff leaf ornament. The capital found by Lethaby at Westminster is so remarkably like the Tower caps, which are not nearly so common as the cushion type, that we may assume that it was contemporary and influenced by Gundulph's work. A parallel to pier 9 is to be seen at Bramber Church in Sussex, and the cap from Lastingham in Yorkshire is strongly reminiscent of Bramber, although further removed from the corinthian prototype. An early form of the octagon solution is seen in the eighth-century cap from Cividale, where a crude incised flower occupies the position taken by the T in the cases which we are considering. For the immediate forerunner of the Tower details we must look to the Abbaye-aux-Dames at Caen, built by Queen Matilda a few years earlier.

The mouldings are not only very elegant but also very "modern" (Fig. 9). We would not be at all surprised to find the caps of piers 5 and 11 or the base of pier 12 in a building by Tait or Emberton, and we must see the mouldings of pier 3 or pier 7 almost every day in modern work. This "modern" feeling is most noticeable in the abacus mouldings, but is also suggested in the bases by a preference for elliptical rather than circular shapes. There is a strong suggestion of the attic base in almost every instance and an occasional foretaste of the Gothic base, as in pier 7, so that we cannot fail to see in this early Norman work the transition from classic to Gothic. The few enrichments are all embryonic; the nail head did not survive in later work, and the elementary chevron of pier 14 may have been an anticipation of the later zig-zag, whilst the curious cross ornament of pier 14 is only paralleled by the very similar form which we meet 600 years later in Jacobean work.

It is natural to regard Norman architecture as a clumsy and ill developed phase, suffering badly from growing pains, but a building like this displays a direct approach and logical reasoning only equalled in the best of Greek work, as I shall now endeavour to set out. Except in the mouldings the refinement and subtlety of the Greeks is certainly missing, but the line of approach is very similar. The capital, for example, is not only an ornamental terminal, but is also a bracket from the column to a wider abacus, wider because the area to be supported is wider. The Romans overlooked that when they adopted the column in their arcuated work and set the arch in line with the necking, but the Normans definitely fill the abacus with the superstructure. The responds of the vault, being different in function from the main piers, are treated differently, on parallel lines to the Greek anta in relation to its column, and the form of the respond is directly controlled by the shape to be carried, as has been pointed out in the case of St. Mary-le-Bow. The cushion capital and the "octagon" cap are as simple and efficient as the Doric of the Greeks; in fact they are more efficient because the whole of the abacus is sup-

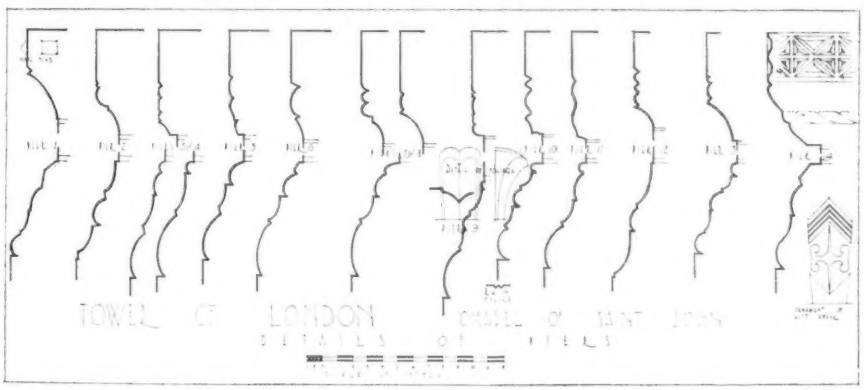


FIG. 9

ported, whereas the corners of the Doric abacus overhang. The use of the nail head and rope as ornament are derived in exactly the same way as the Doric triglyph and mutule, and the elliptical mouldings have a decided Greek flavour. If, then, we accept the Doric approach to architecture as the correct one, we must accept the Norman approach as equally good—and perhaps apply the same standard to the moderns.

The Military Orders

The military orders of Templars and Hospitallers are undoubtedly to be classed among the early monastic establishments of London, but they had a rather unmonastic outlook with consequent architectural implications that merit enquiry. Such enquiry is to a large extent beyond the scope of this work, which is confined to "survivals," and I shall therefore be brief. We must not forget that the monastic idea, born during the closing years of the Roman Empire in the East, was by the eleventh century universally accepted throughout the whole known world, with settlements in every country where Christians were likely to be found. Thus it was possible to undertake pilgrimages over long distances linked up by monasteries where hospitality could be claimed. These pilgrimages, whilst partaking in large measure of the delights of a holiday, were necessarily dangerous, for roads were bad, diseases and wild beasts were to be met, marauders and thieves were lurking in every shadow, and the companions of the caravan were ill assorted. Dangerous as this was when the goal was the shrine of some saint within the country, it became more so if the journey were longer, when some foreign shrine or Rome itself might be the goal, and especially was this danger increased for those who undertook the formidable journey to the Holy Sepulchre at Jerusalem, more particularly after the rise of the Mohammedan Empire.

About the year 1023 a hospital was founded in Jerusalem for the care of the poor and sick, maintained by a body known as The Poor Brethren of St. John. A comparatively unknown and poor organisation, whose patrons and patients hitherto had been the pilgrims from distant lands, it attracted considerable attention after the first crusade of 1087 and rapidly rose to a position of wealth and numerical strength. About a century after its foundation The Poor Brethren of St. John became the Order of St. John of Jerusalem with a status of knighthood. With far less peaceful intentions the Order of Templars was founded in 1118, its object being to protect pilgrims and to defend the Holy Sepulchre. As the holy wars progressed the two orders readily took on a more military aspect, and after the fall of Jerusalem, when the Hospitallers no longer had a hospital and the Templars had no pilgrims to protect, it was only the crusades which gave the orders a *raison d'être*.

Both orders were recognised by Rome as religious rather than secular communities and each was given a rule and lived in monasteries. An inspection of the rule and some of the later ordinances shows that the Knights could not possibly be regarded as monks, for their life took on certain aspects which no monks would accept. For example, the Hospitallers were sworn to Chastity, Obedience and Poverty, but a rider is added, "so that, being inflamed by charity, they might have no dread when taking the sword in hand." Again, we find a decree concerning the price of plunder taken on raids, and the rule of the Templars expressly states that "the armed knights may, without blame, kill the enemies of the Cross." It is also decreed that "no bailiff nor any other brother may give away or sell outside the house any slave, unless he be an old or sickly slave, etc.," and the Knights were allowed esquires, varlets, and other servants. Hunting after hounds and hawking were forbidden to both orders, for weapons were dedicated to the defence of Christ, but the Templars were allowed to hunt the lion "because he is set against all men." The Hospitallers were allowed to have nuns because of their services in tending the sick, but the Templars were forbidden to have any contact with women, especially was it forbidden to kiss even their own mother, but married men were admitted upon certain conditions. Social distinctions were recognised as many of the ordinances show, as for example that ". . . no one, unless he be born of a legitimate marriage, shall be a knight in the House, unless he be the son of a Count or of someone of higher degree. . ." and it is also ordained that "everyone who enters the Religion of the Hospital, let him do the same work that he did in secular life. . . ."

Of the life within the monastery the ordinances give clear pictures. There were many grades of officers; it was permitted to hold property; and generally the rule was lax. It seems that the brothers slept in dormitories, but from references to things which a brother may do "in his room" the dormitory appears to have been divided into cubicles. The exercise of arms was enjoined by the rule and a sufficient space for such exercise must have been provided. Meals were eaten at a common table while one brother read a passage of scripture, and it is declared ". . . let the food and drink be sufficiently good, so far as the House is able, so that the brethren can and should tolerate and endure it." Meat was not forbidden, neither was conversation in the cloister, but prayers were to be said in silence so as "not to disturb the obsequies of others." The Chapter House and Infirmary were important features of the house, and as hospitality was enjoined by the rule, the guest house too was prominent. An allowance of clothing was granted to each member, with certain regulations against the wearing of boots, but "boots" clearly has some special significance, for it is declared that ". . . he shall put them off or put over them his shoes." In the case of the Hospitallers it is provided that ". . . the brethren shall

have three shirts and three pairs of breeches, and one coat and one hat, and three sheets on the bed and the fourth in a bag, a long smock and cowl, and two mantles, one with wings and the other without wings, and hose of flax and wool.

"The Master shall have three mounts for himself, a charger, a palfrey and a mule, and one varlet and three esquires, and each should have his mount, etc."

The Hospitallers and Templars did not have the same rule or ordinances, but they were very similar organisations and their monasteries, while unlike other religious houses, must have been very much like each other. No plan has been reconstructed of the two houses in London, and as there are scanty remains, no plan is likely to be produced. But in trying to visualise the estate on the present area of the Temple, for example, we can formulate certain ideas from the foregoing paragraphs. The monastery must have been more like a fortress than a religious house and the cloister was a mere symbol rather than a peaceful retreat. The stables and armouries must have been large, and the treasury, too, was of some considerable size. The church in each case was small. The fortresslike aspect of the house is suggested by the existence of such officers as marshals, and sergeants, and we know, too, that the Templars undertook to act as bankers or guardians of men's wealth because their house was secure, and we also know that the Hospitallers resisted by force the attempts to dispossess them after the dissolution. Although then there was the usual provision of frater, Chapter House, farmery, cellarer, dormitory, and other domestic offices, there were also various military provisions of which no other house can offer a clue.

One further comment may be made. The Hospitallers are probably the first recorded case of hospital planners, for little is known of Charlemagne's hospital that preceded them, and St. Bartholomew's was founded 100 years later. The ordinances throw a glimmer of light on the organisation and I may plead forgiveness for quoting them:—

> "Furthermore it is ordained with the assent of all the brethren that four experienced doctors shall be appointed for the service of the Poor . . . qualified to examine urine and to diagnose diseases, and to assist them by the administration of medicines.
>
> "It is ordained how long and how broad should be the beds in which the sick lie, and that each bed should have its coverlet and two sheets of its own.
>
> "It is ordained that the poor for going to and returning from the latrines should have cloaks of sheepskin, boots for their feet and caps of wool.
>
> "Furthermore I have ordained and commanded that small cradles should be made for the babies of female pilgrims who shall be born in the House, so that they may lie alone and separate, lest any accident should befall them from their mothers.
>
> "Moreover, I have commanded that the beds of those that die should be screened off. . . .
>
> "The Holy House of the Hospital has been accustomed to receive in kindness sick men and women, and to have doctors who are in charge of the sick, and are accustomed to make the necessary syrups for the sick. Also, according to the good customs of the Holy House, three days in every week fresh meat is to be served to the sick, either pork or mutton, and those who are unable to eat this meat are to be provided with chicken.
>
> "And let the brethren of the Hospital by night and by day cheerfully and gladly tend the sick as their lords. Moreover it was added in Chapter-general that, in every ward of the House where the sick shall lie, nine servants shall be appointed to wait upon them, who at command of the brethren shall humbly wash the feet and heads of the sick, and cleanse their garments, and make their beds, and prepare the food they need, and give them to drink and be obedient in all things for the benefit of the sick."*

ST. JOHN'S, CLERKENWELL

The foregoing note on the Military Orders may appear to have all the attributes of an interlude, but it would be unreasonable to consider the London houses without first enquiring into the nature of the society which built them. The chief house of the Hospitallers in this country was at Clerkenwell, adjoining the house of nuns already established near the Fleet River. The date of the first foundation is uncertain, some having maintained it to be 1100, while others assert it to be 1140, and from a belief that it was earlier than the house of the Templars, which was established in 1135, some have placed it at about 1134. Mr. Round, who deduced very good reasons for placing the foundation in 1140, has made out a strong case and allowing for a period of building, it seems reasonable to accept the decade 1130–40 as dating the work. Stowe states the area of the monastery to be ten acres, and the existing foundations have indicated a wedge-shaped site on a N-S axis, with the larger side about 600 feet, on the north, the church being roughly on the axis of the site and nearer to the north boundary.

The greater area being to the south of the church, we may assume that the cloister and most of the buildings were on that side, but Hollar's drawings, which are the only drawings of the house known to exist, show a range of very important looking buildings on the north side. The church, therefore, occupied a key position to the whole block rather than forming one side of the block, as is usual in religious houses. The Losely Hall MS., quoted by Mr. Clapham, contains an inventory of the buildings standing at the time of the dissolution but with no clue to their position. The principal dorter was 120 feet long,

* I would point out that these ordinances are meant to apply only to the hospital at Jerusalem, but the monastic farmery also received special consideration and was probably larger than in most monasteries, although there is not enough evidence to deduce that it provided for anybody besides members of the community. I would add, too, that the mere reading of these ordinances is sufficient to justify their inclusion as "survivals."—D. R.

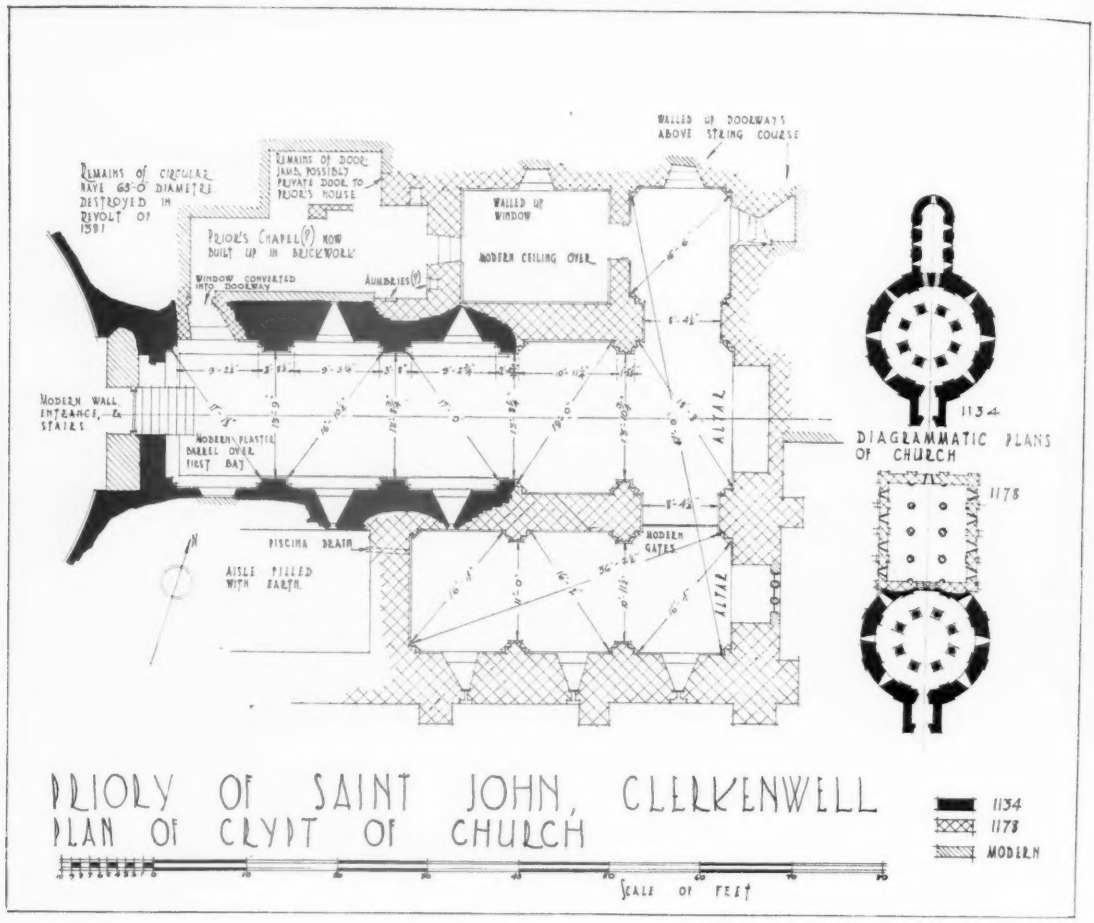


FIG. 10

the armoury 54 feet long and 18 feet wide, the great hall 120 feet long, containing at one end a grand staircase 24 feet by 18 feet, and the great hall of the Prior's house 105 feet long. This suggests very palatial quarters for the Prior, and we cannot doubt that the same scale prevailed throughout. There were also a distillery, counting house and wardrobe, and a separate yeoman's dorter for those below the rank of Knight. Taking the dormitory as a typical unit, Clerkenwell was roughly as large as St. Bartholomew's (120 feet) and a little smaller than Barking (160 feet) and Westminster (200 feet), but taking the church as a typical unit we find the lengths to be: Barking 300 feet, Westminster 280 feet, St. Bartholomew's 280 feet and Clerkenwell 150 feet. Thus we can get a very good idea of the relative values of secular and religious duties in the Military Orders.

Actually the house was amongst the wealthiest in the country although to a large extent insolvent. Farmer gives a list of twenty-eight religious houses selected to pay certain dues to the Treasury in the reign of Edward III, and amongst them were:

	£	s.	d.
1st. Westminster, valued at	3,977	6	4¾
2nd. Glastonbury ,, ,, ...	3,508	13	4¼
4th. Clerkenwell ,, ,, ...	2,385	19	8
10th. Romsey ,, ,, ...	1,983	15	3½
16th. Waltham ,, ,, ...	1,079	12	1

This estimate probably does not recognise income from preceptories and distant estates, for an audited account of the fourteenth century, not long after this valuation, shows the total income of Clerkenwell to be £8,000 p.a., with expenses £8,500 p.a., and we must remember that

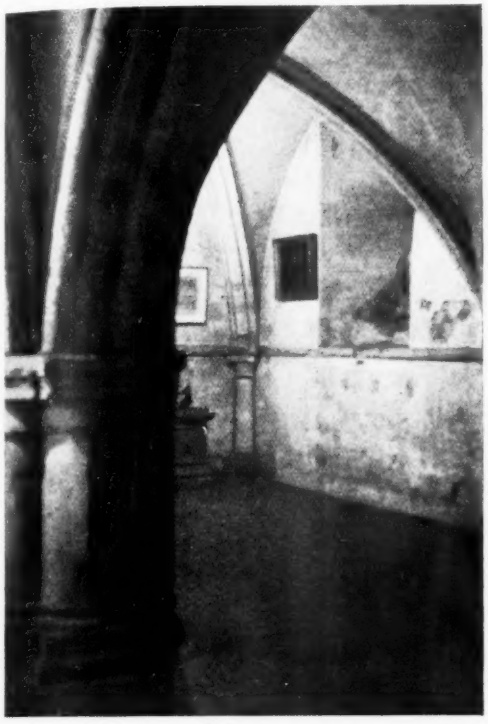


FIG. 11

FIG. 12

the money had about 20 times the value that it has to-day. The Prior received 20s. per day, and other heavy expenses were incurred by the lavish hospitality, enjoined by the rule, bribes for magistrates or justices, and corrodaries, *i.e.*, persons who, as payment for a loan or service, received a pension or maintenance from the house. A further idea of the value and size of the monastery is suggested by the fact that the grand Prior took precedence over all the temporal peers and that in 1381, when Wat Tyler seized the city and set fire to the Priory, it burned continuously for seven days. It was the last of the religious houses to be dissolved by Henry VIII, but he did not destroy it, and it survived for many years as the royal storehouse and armoury. The Protector Somerset, however, after Henry's death, set greedy eyes upon it and with the aid of a little gunpowder soon reduced it to a ruin, so that he could use its stones to build his new palace in the Strand. The fire of 1381 followed by Somerset's destruction of 1545 and the various later uses of the site have left us very little of the ancient work, and the only Norman work to survive is the crypt of the church.

The crypt appears to have extended only under the choir of the church and in the first place was a small chamber some 15 feet wide and 40 feet long, probably with an apsidal termination. A portion of the wall of the nave is standing at the entrance to the crypt and other portions have been found under the present roadway, forming a circle of 65 feet diameter. The crypt must have been entered near the east end of the nave, possibly from the nave itself. It has been suggested that there was a double flight of stairs in the nave, one flight rising to the sanctuary and the other descending to the crypt (Fig. 10), as was generally practised in Italian Romanesque churches. At a later date the sanctuary was enlarged into an aisled choir and the crypt was also enlarged to carry it, the new work being commenced about 1178 and dedicated in 1185. It will be seen, therefore, that the total length of 150 feet, quoted above, does not give a true estimate of the size of the church, for the circular nave is little more than half of the area of a square nave having the same length, and the first choir made a very small addition to the area. There can be no doubt that the churches of the Military Orders were very small and clearly the services of the church were only incidental to the other duties of the house. The brethren of the order were definitely sworn to a life of religious devotion, and in the words of Mr. Kemble, "it so happened that, being much versed

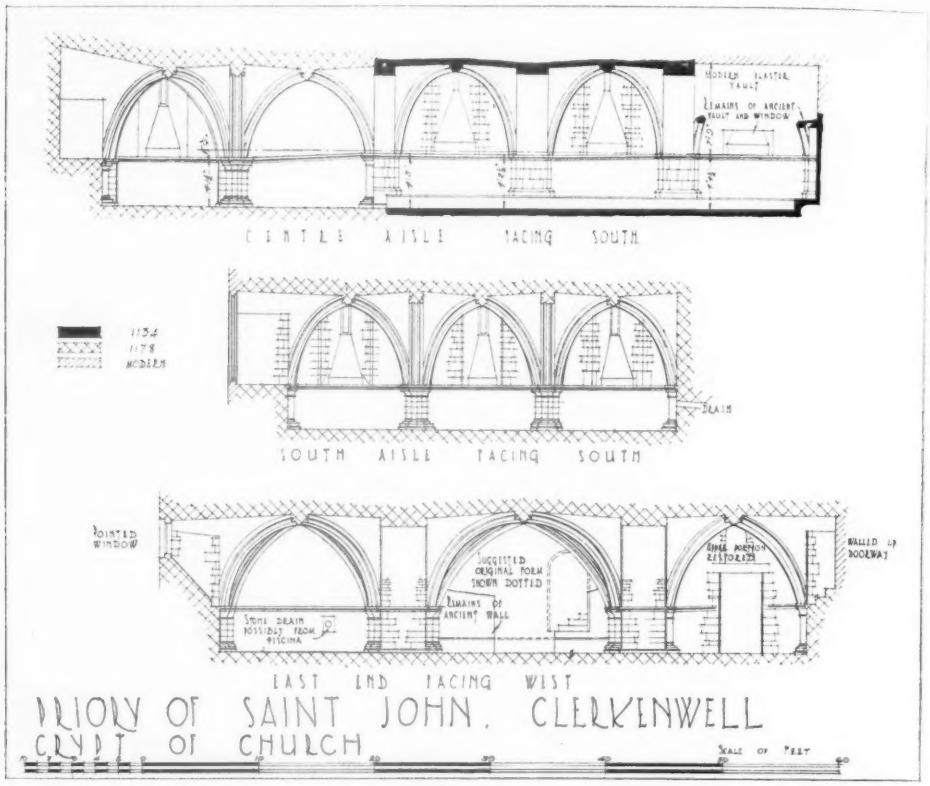


FIG. 13

in arms and accustomed to perilous adventure, they took up a career of fighting as the most useful way of devoting themselves to the service of God and their neighbour." The church, therefore, was smaller than the guest house or dormitory, but that reflects only the ritual of the house and does not indicate any lack of religious devotion.

The round church was found in every place where the two orders settled and may almost be acknowledged as a symbol of their presence, although occasionally round churches were built without any connection with them. The explanation offered is that the fourth-century church of the Holy Sepulchre at Jerusalem was circular and the two Orders, who had their principal seat at Jerusalem, adopted the round nave as a symbol of the church which they were pledged to defend. During the crusades this idea became popular and so other people also occasionally raised round churches. There were ten such churches in this country, nine of which belonged to the two Orders, and the remains of five are still standing. In two of these cases the inner circle of piers carries a bell turret, and this may have been a general rule, for in most cases the church was small enough to roof without intermediate supports. The triptych of the altar at Clerkenwell, presented by Prior Weston in 1480, shows a circular church of Norman design which quite possibly is a reproduction of the church at Clerkenwell.

In the present crypt (Fig. 10) the centre aisle consists of five bays, of which the first three belong to the earlier work, and the south aisle appears to consist also of five bays, only three being now accessible, for the western portion is walled off and filled with earth for interments. The north aisle, divided into three chambers, appears to have had some separate use, only one chamber being included in the crypt. It is known that the Prior's house, with its private chapel, stood close to the church on the north side, and it is believed that the western compartment of the aisle was the chapel, for it was accessible from the crypt, and there are remains of another door which could have led into the Prior's house, whilst the small recesses in the walls might have been aumbries or shrines. There is nothing to suggest the particular purpose of the centre chamber of the aisle, but the eastern chamber, forming part of the main crypt, has given rise to conjecture (Fig 12). Two doorways, now walled up,

stand upon the string course about 4 feet 6 inches above the floor and steps rise from the string course into the doorways. It has been suggested that one of these doorways was external, communicating with the cemetery, and possibly the other opened into a charnel house, access to the crypt being provided for the funeral service, but no satisfactory explanation is given for stopping the stairs on the string course instead of continuing them to the floor of the crypt. In the case of the northern doorway the markings of the wall suggest that the stairs did continue to the floor, but the eastern doorway does not offer that suggestion. Another curious feature is the small channel through the wall dividing the earthed portion of the south aisle from the remainder, quite possibly a drain from a piscina, but it is not usual for a piscina to be in the west wall. The external buttresses indicate that the choir above consisted of four bays, ignoring the divisions of the crypt.

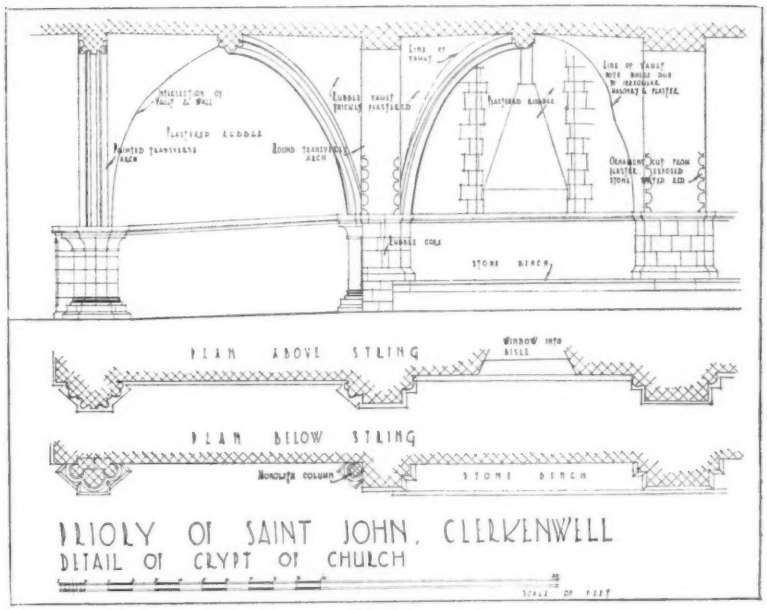


FIG. 14

The change from the earlier to the later work is very marked. In the centre aisle the heavy round arched work of the first crypt finishes abruptly at the third bay, and the more delicate pointed work of the later period begins without any form of introduction (Fig. 13). The short piers of the early work are formed by square facets, as in the previous examples which we have discussed, the splayed bases standing upon a stone bench and the caps being formed by returning the string course. The windows are small, with circular heads and deeply splayed cills—the major part of the crypt being below ground level—and the only sign of an advance in architectural character is the use of stone ribs for the groins (Fig. 11), but this is not a very telling sign, because stone groin ribs were used at Durham in 1093 and Tewkesbury in 1102. The later portion of the crypt, however, shows very advanced features, for not only are the mouldings more varied but the piers are clustered and the pointed vault is used (Fig. 16).

A comparison of the two periods is shown in Fig. 14. In the earlier work the transverse arches are wide, formed of plastered rubble with ashlar quoins, and the diagonal rib moulding is very elementary in design; the transverse arch is a semi-circle and the diagonals segmental (Fig. 15). The vaulting bay is not square, and since the wider span is semi-circular an adjustment is made in the narrower span, which is elliptical on a minor axis, but the elipse has been designed without reference to the curve of the diagonal, so that the diagonal

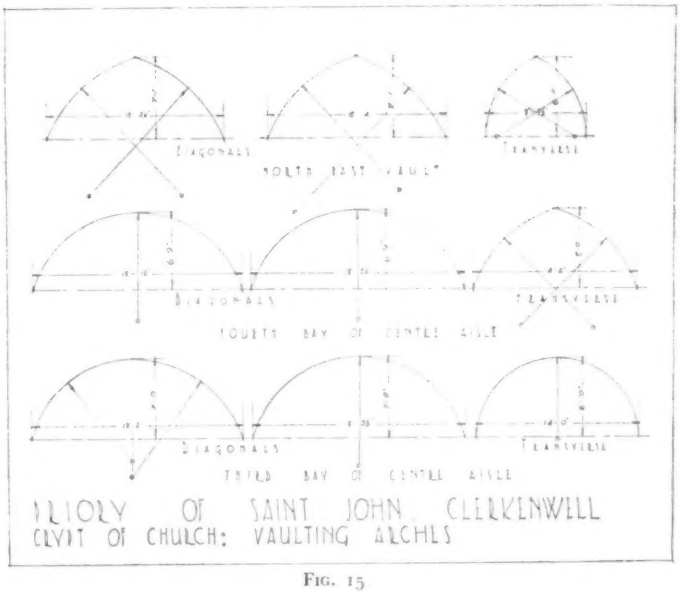


FIG. 15

FIG. 16

has to be built up to support the vault in the north and south compartments (Figs. 11 and 14). A most unusual enrichment is found on the arches of these early bays, in which the plaster of the vault is returned on the face of the arches and finished with a serrated edge, forming a saw tooth or scallop pattern (Fig. 18), the same treatment being applied to the soffits of the transverse arches (Fig. 14). The face of the ashlar thus left exposed was apparently tinted red. In the later work the diagonal arch is still segmental but the transverse arch is pointed (Fig. 15) and both have interesting mouldings considerably in advance of anything which we have yet met. The introduction of the pointed vault has solved the difficulty of unequal spans and at the same time has suggested a new motif in decoration, for the keel form is now found in the wall pier and is reflected again in the diagonal rib. The rib is, in fact, a miniature reproduction of the pier, an interesting sidelight on the resources of mediæval designers. The transverse rib moulding (Fig. 18) is a development of the angle roll which we observed first at St. Bartholomew's, and at this stage we may refer back to the "potato cellar" at Waltham. There the vault is similarly constructed with pointed arches and segmental diagonals, and the clustered pier has a similar trefoil form, but the mouldings are just a little earlier in character. The first stage

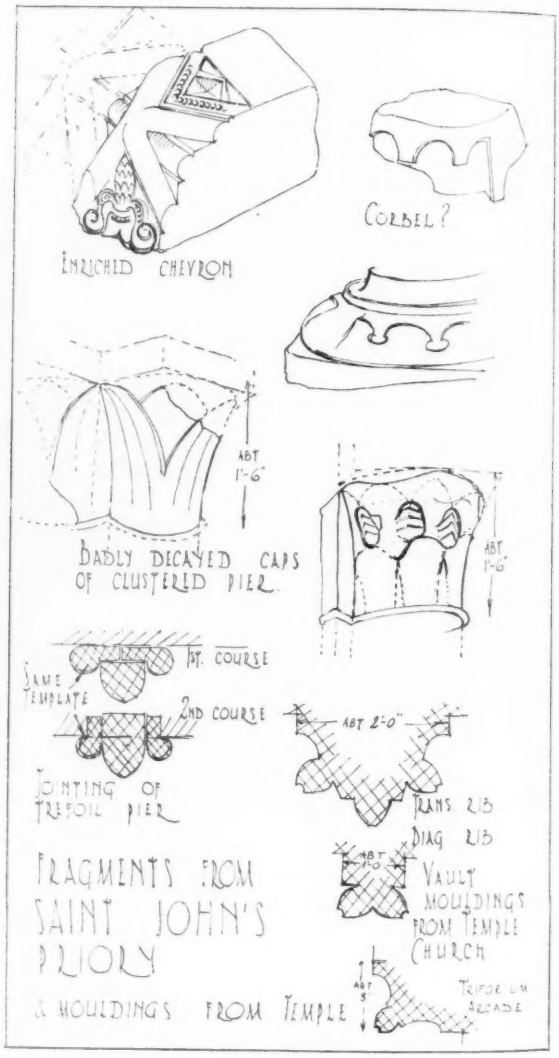


FIG. 17

towards moulding a square stone was to chamfer the edges, and that stage still survives at Waltham with the addition of a further development in the keel. The transverse arch moulding at Waltham is also not quite so advanced as at Clerkenwell, but the two cases are very similar, and clearly there cannot be many years between them. In the work of both periods at Clerkenwell, as also at Waltham, the vault is of heavy rubble faced with plaster and there is no wall rib. A slight advance is shown by the east bay of the north aisle in which the diagonals as well as the vaults are pointed (Fig. 17).

The detail of the piers is very delicate. Where only a diagonal rib has to be carried a small monolithic column is used, but in the other cases the piers are built up and bonded into the wall, the same shape of stone serving for each course (Fig. 18). The caps are very delicately formed and very fine modelling occurs in the bases, the attic form still surviving but with a water-holding roll introducing the early Gothic form. A large number of moulded fragments have been collected from excavations and demolition in the district, most of them fairly late in character, and many still retain patches of applied colour decoration, principally red or blue. Among these fragments are some very badly decayed capitals (Fig. 18) about 1 foot 6 inches deep, which must have come from the body of the church, but so badly are they perished that they defy reconstruction and we are just able to discern that they were foliated. A careful examination of the facing stones in the crypt has revealed a large number of masons' marks cut very shallow with a sharp instrument. The full significance of these marks has still to be discovered, but it is generally believed that they were in the nature of a signature, each mason having his own, although possibly a gang of masons under one supervisor would use one mark, or masons belonging to the same guild or company might have a common mark. At Clerkenwell there are twenty different marks in the early work and seventeen in the later, the earlier marks varying from 3 inches to 7 inches in length and the later marks from 1 inch to 4 inches. Most of the marks are varieties of a simple cross, but the long bow and arrow with more involved symbols also occur, and the whole collection is very reminiscent of those found at Canterbury and elsewhere. There is an interesting field of enquiry in these marks, but we must avoid rash conclusions, a timely warning being delivered by Dickens in *Pickwick Papers* when "XBILST UMPS ISM ARK" is revealed to spell "X. Bill Stumps—his mark."

This little building marks a transition from the twelfth-century Norman to the thirteenth-century Gothic, with strong family ties to the twelfth century, of which it is a child. It still belongs to the Norman group by virtue of its rubble vaults, its segmental arches, its square abaci, and its wrought columns, but it has claims to the Gothic in its pointed arches, its ribbed vault, and its undercut mouldings. A very few years more were to see the Gothic spirit rise new fledged from the Norman nest.

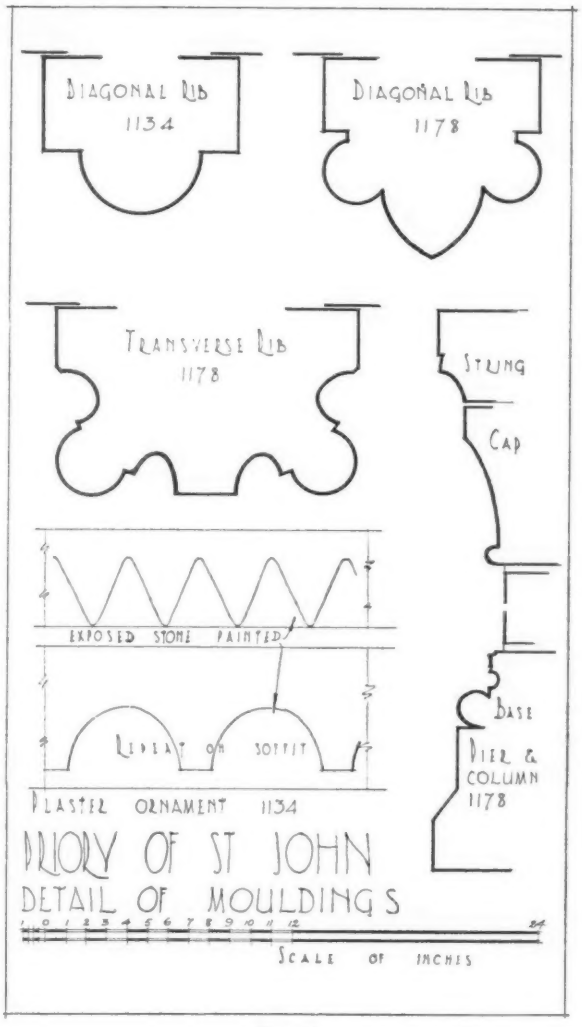


FIG. 18

THE TEMPLE

The Templars, founded in Jerusalem in 1118, had a home in London in 1135 near the north end of Chancery Lane, and a few years later moved into more spacious quarters on the banks of the Thames, the first premises

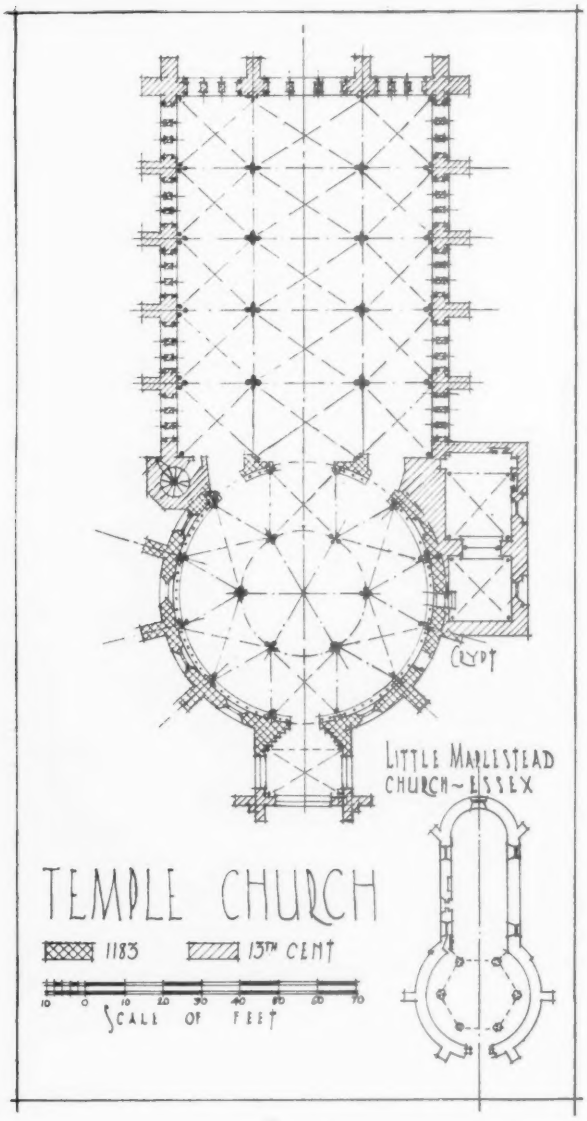


FIG. 19

being known for many years as the Old Temple. In 1876 excavations in Holborn laid bare the foundations of a circular colonnade of six columns, thus establishing the site of the Old Temple and the fact that its church was round. The new Temple extended from "Whitefriars to Essex House" on the area now occupied by the Inner and Middle Temple on the south of the Strand, but we know nothing of its arrangement or accommodation. Until the fall of Jerusalem the Templars were held in great esteem as staunch defenders of the Faith, but when the Holy Wars were ended men began to notice that the wealth which had been generously provided in the cause of the Cross now enriched the Templars in whose hands it rested. Philip of France, with mediæval candour, seized all their property in France and threw the knights into prison. The Order appealed to the Pope to protect them from secular justice in consideration of their ecclesiastical vows, and a long controversy waged before it could be settled whether the Templars were a secular or a religious community, and in view of their peculiar life and rule this is not surprising. The Pope's authority was eventually recognised—and at the same time, incidentally, the Pope recognised the advantages of conciliating Philip of France—an ecclesiastical court being constituted to interrogate the Templars upon false and ridiculous accusations. The court, by long perseverance, aided by the rack and rigorous imprisonment, succeeded in wresting from the stoic and suffering knights a confession of guilt and the Order was accordingly dissolved. In France this was accompanied by a vicious *auto-da-fé*, and in all countries by the seizure of the Templars' wealth by the Crown. Indeed the only proved offence of the Order was its accumulation of wealth, and its suppression was so eagerly sought only because the suppressors had a raging desire to commit the same offence.

In England the persecution of the Templars began in 1308 and the final suppression followed the Papal bull of May 1312, which dissolved the Order and translated all its property to the Order of St. John. For it should be noticed that the Knights Hospitallers survived the crusades by carrying on the defence of Christians and the persecution of infidels from their fortresses at Rhodes and Malta, thus maintaining popular favour. The bull was resisted by the royal vandals, but eventually, after many thunderings and excommunications from the Vatican, they yielded, taking the precaution to retain sufficient to repay the expenses of the trials—by their own assessment. The following synopsis of the adventures of the London house is inscribed on a drawing of 1739, following very tersely the story as told by Stowe: ". . . by a general council at Vienna ye whole Order was dissolv'd throughout Europe. K. Edward II then gave this stately Monastery to Aymer de Valence E. of Pembroke, after whose death, Hugh Spencer illegally seiz'd and possess'd ye Premises during Life, when, reverting to ye Crown, K. Edward III granted ye same to ye Knights Hospitallers of St. John of Jerusalem, who demis'd ye House to certain Students of ye Law for £10 pr. An." Wat Tylor raided the Temple in 1381 and burned all the documents that he could find, so that all record of the Norman monastery has been irretrievably lost. Tyler's revolt was the reaction of an oppressed peasantry against unfair taxation, and his selection of the Hospitallers for destruction speaks very

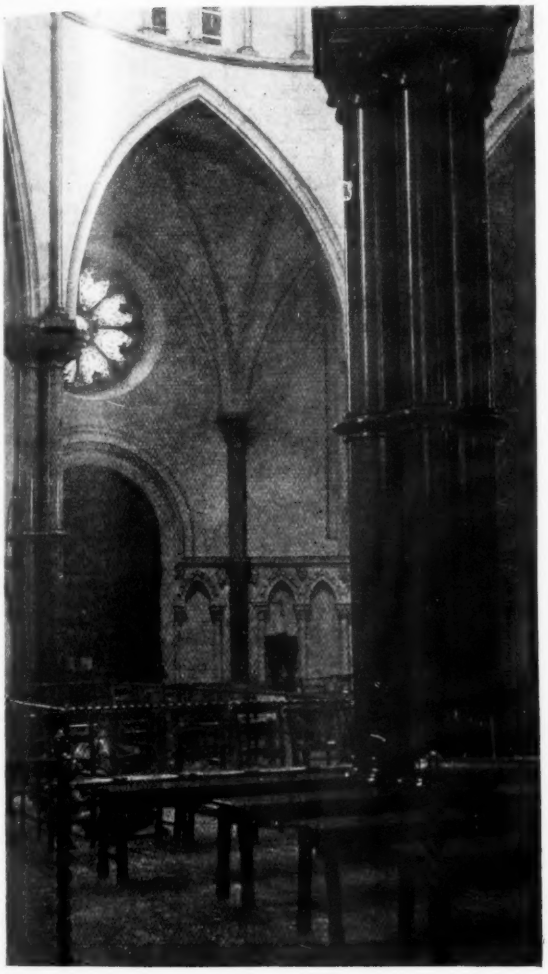


FIG. 20

clearly of the hatred inspired by that wealthy organisation in the "working classes" of the day.

Since then the history has been one of rebuilding and restoration, and to-day very few of the original stones are still standing. Most of the buildings were destroyed by the end of the sixteenth century, and in 1678 the remains of the cloister were consumed by fire and re-erected in the Tuscan order in 1681. In 1838, Billing recorded two bays of a cloister extending west from the porch of the church, and since the present Tuscan cloister is exactly south of the porch, it follows that the church stood at the north-east angle of the cloister on the axis of the north walk. It is clear from the rule that Sunday processions were held, and these no doubt included the whole cloister as well as the church, entering and leaving the church by the main west door. The church itself (Fig. 19) was similar to Clerkenwell, with a circular nave 59 feet diameter and a three-aisled choir five bays long. The plan illustrated is based on Britton's plan of 1811, when the crypt of St. Katharine's chapel was still standing to the south of the church with the ruins of St. Anne's chapel above, a beautiful piece of thirteenth-century work torn down in 1825 by Robert Smirke to disencumber the south wall of the church, although it was not suggested that the south wall of the church (which had to be rebuilt) was necessarily an improvement. The choir also being thirteenth-century work only the round nave remains from Norman times, and most of that has been rebuilt in the five restorations between 1682 and 1842. No records remain of the church that was dedicated in 1185, but we know that the extension at Clerkenwell was dedicated at the same time and it is not unlikely that the two churches were identical in plan. The only thing which throws doubt on that idea is that the present choir is obviously about 50 years later in date, and since there must have

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FIG. 21

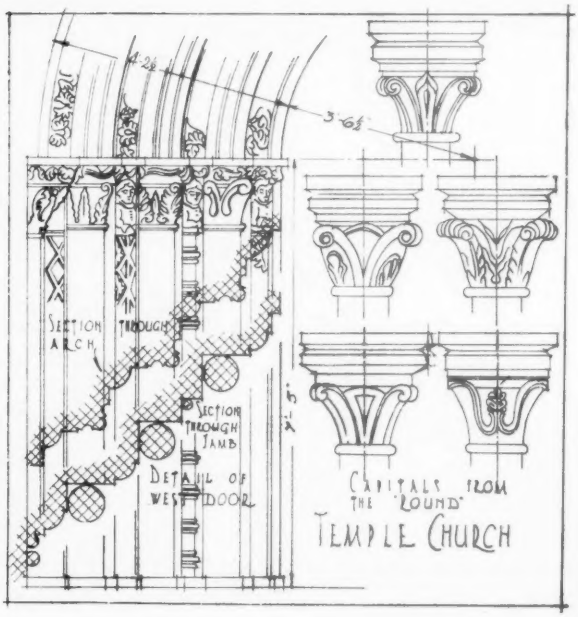


FIG. 22

been some sort of choir at the dedication, it is possible that the first choir was rebuilt, in which case it would most likely have been a small sanctuary like the first choir at Clerkenwell. The plan of Little Maplestead church, built by the Hospitallers and still standing, is included as being typical of the churches of these two Orders. The stair turret is part of the Norman church.

The west portal of the church, which is very richly carved (Fig. 21), gives direct access to the circular nave, consisting of an inner ring of six clustered piers surrounded by a vaulted aisle, the outer wall being divided into twelve bays of arcading. The plan of the aisle vault suggests that vaulting problems are a step nearer solution, for here we have triangular bays, only practicable with a pointed vault. The rib mouldings (Fig. 17) are still Norman in character and segmental in form, but the infilling is of dressed stone and wall arches are used, concentrating the whole weight of the vault at the buttresses, whilst bosses appear for the first time. With a slight development in the mouldings and pointed diagonals this would have to be called Gothic instead of receiving the courtesy title of Transitional. The clustered columns are formed by four shafts of Purbeck marble, copies in 1841 of the decayed originals, joined by a common cap and base with a binding course at half the height, the caps being decidedly late Norman in character. The Purbeck marble shaft, wrought by lathe, is a new feature in architecture and again tells of the swan song of Norman. The arcade above these piers is pointed and each pier carries a vaulting shaft of Purbeck marble (Fig. 20). The central roof was originally vaulted, for Strype in 1754 describes it as "something like a dome," and in 1838 when a flat ceiling existed the lower voussoirs of the ribs were still in position. The present vault is of wood, built in 1842 "strictly in accordance with the style of the period."

The arcading of the aisle is pointed, with a grotesque head in each spandril, the supporting columns presenting a great variety of design. This arcade was rebuilt in 1827 and may be regarded as modern, but it follows the general design of the earlier arcade and some of the original grotesques and columns have been re-used (Fig. 23). The original wheel window over the west door (Fig. 20), the forerunner of the Gothic rose, was discovered in 1841. It consists of eight spokes, grooved

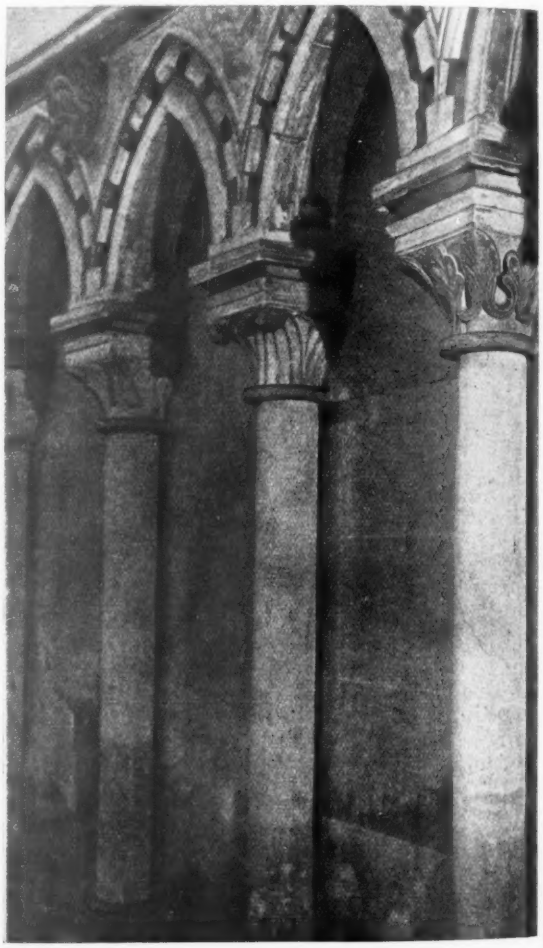


FIG. 23

for glass, each taking the form of a Romanesque column with its base on the outer rim, and it has been so constructed with wedges that it would hold together without any lateral support. Perhaps the most interesting feature of the church is the blind triforium faced with an arcade of interlacing round arches, with openings in the wall at the centre of each bay. The present Purbeck marble shafts are probably not original, for a general statement occurs in the *Gentlemen's Magazine* of 1842 that new polished marble shafts were substituted for the old columns, and I take it to refer to the triforium (Fig. 24).

Although dedicated in 1185, this church is practically a Gothic building. The only remains of Norman work are the plan, the west portal (partly restored and reworked), the triforium arcade, a few columns and heads in the aisle arcade, the principal arches, and the aisle vault—but I find a note that the aisle vault was "reworked" in 1842. Externally, the portico, the roofs, and the facing of the walls are all modern. The effigies on the floor deserve a comment, for they are beautifully sculptured and historically interesting. One was brought from the Old Temple in Holborn, and most of the others are of thirteenth-century date. It has been suggested that originally they belonged to table tombs, destroyed by Wat Tyler, but Stowe comments on them without any suggestion of such a transplantation, and it is quite possible that they lie directly over the graves of the men whom they commemorate. I feel, too, that we need not attach great importance to those mystics who have found abstract symbolism in the various parts of the church, some finding mystical repetition of numbers, *e.g.*, twelve columns, twelve bays, twelve leaves, etc., and some asserting a symbolic use of the vesica piscis in the plan. The Templars were certainly mystically inclined, but the evidences from which these theories are deduced do not appear to me to be conclusive.

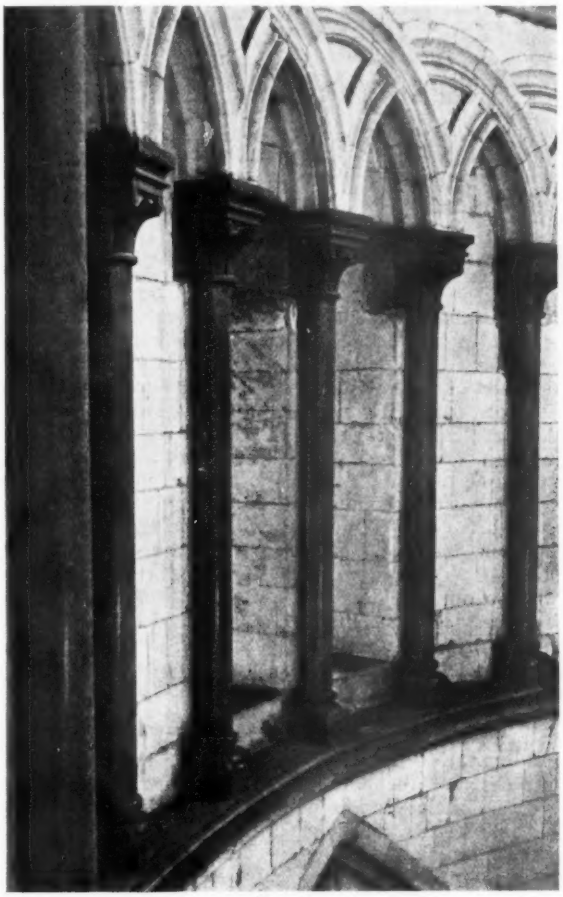


FIG 24.

"*Times*" *photograph*

RESULTS OF THE EARTHQUAKE AT NAPIER, NEW ZEALAND

Earthquake Resisting Design

BY C. REGINALD FORD, F.R.G.S., F.R.I.B.A.

A PAPER READ BEFORE THE NEW ZEALAND INSTITUTE OF ARCHITECTS ON 27 FEBRUARY 1935

THE purpose of this paper is to give a brief summary of the present state of knowledge of earthquake movements as they affect building structures; the methods to be adopted in the design of buildings to resist earthquake forces in the light of that knowledge; the lines of research necessary in order that the data may be gained which will make the groundwork of future aseismic building design at once more certain and exact. In conclusion the economic side of the problem will be discussed.

In the limits of this paper the principal points only, of interest or importance, can be touched upon; much must be left unsaid, and it will be obvious that no portion of it is considered to be a complete statement of that part of the problem to which it may refer.

DISTRIBUTION AND FREQUENCY OF EARTHQUAKES

The frequency of destructive earthquakes within the last few years in many scattered parts of the globe suggests that earthquakes are not the rare phenomena which we would like to think. Dr. Charles Davidson in *A Manual of Seismology* (1921) states that the average number per annum of earthquakes sensible to human beings is probably about 4,000. The number instrumentally observed is much greater. One recent writer (W. M. Butts) states that during the year 1926 observatories throughout the world recorded nearly 32,000 earthquakes, nearly one hundred of which were destructive to life and property in some measure.

It is true that some parts of the world are more liable to earthquake shocks than others, and that in any country which is seismically active some parts are more likely to experience a shock than other parts. At the same time, in our present state of knowledge, it would be very unwise to assume that the particular part of the world which we happen to occupy is not likely to be subjected to shock, however comforting such an assumption may be.

It has been suggested that some parts of New Zealand should be exempted from the earthquake provisions of the new Building Code now in course of preparation, or that the seismic coefficient of the Code should be varied for different parts of the country in accordance with the assumed variations in the possibilities of the occurrence of destructive earthquakes. This has been attempted in Italy, for example. But of the Italian earthquake of 23 July 1930, when certainly more than 1,500 lives were lost and property of enormous total value destroyed, Professor Alfano, Director of the Meteorological and Geological Observatory of Pompeii, wrote in a Report: "The localities

most violently shaken by the recent earthquake do not coincide with epicentrums previously known, but have the appearance of arising from a new centre of disturbance . . . apparently there was nothing in history since 1694 to indicate that the central portion of the zone recently stricken was particularly susceptible to earthquakes of destructive intensity."

Earthquakes are as natural a phenomenon as rainfall, frost or ice, or any other world-building force, and as such, not to be feared, not to be ignored, but to be accepted and prepared for in a rational manner. Given even the possibility of disastrous earthquakes (that is those of sufficient violence to be a cause of destruction of property and loss of life), it is surely the action of reasonable men so to construct their buildings in which they gather or dwell that they may not fail or be destroyed in the hour of danger. To refrain from doing so if it can be done, and done with reasonable economy, would, indeed, seem to be the act of madmen.

FACTORS GOVERNING DAMAGE TO BUILDINGS

In the few years immediately past there have been a number of earthquakes in various parts of the world and the reports of competent observers upon the damage to buildings in the stricken areas are available and should be read by every architect. I am inclined sometimes to think that in our own experience the results of the Napier earthquake caused rather a mistaken estimate to be made as to the supposed failure of existing methods of building construction. It was natural enough, perhaps, when surveying the ruins of what had been a fair city, and gazing upon the masses of fractured and fallen masonry, to assume that all accepted forms of building construction were unsound and a complete revolution was necessary. But later reflection brings to mind that, after all, the great destruction at Napier was due in no small measure to several factors not necessarily indicative in themselves of any failure of the existing methods of building construction if properly understood and faithfully carried out. Amongst these factors was the existence of a number of obsolete buildings erected in earlier years and altered at intervals subsequently without thought or skill, and of many buildings of more recent date in which were present elementary faults in design, even for normal conditions. There were, too, instances of buildings, both old and new, the construction of which embodied details and methods which observation of buildings damaged or destroyed in other earthquakes has shown to be dangerous and which might easily have been avoided. Worse still there were, too, many examples of careless or in some cases culpably bad or dishonest workmanship which should be made impossible in the future. Under earthquake conditions scamped and dishonest workmanship is little, if at all, short of criminal.

In one particular a revolution in building construction in New Zealand is, however, necessary. That is in the recognition of the very real possibility of buildings being subjected by earthquake shock to horizontal vibrational stresses and the need in future construction of the abandonment of those methods of design and details of construction which experience has proved to be dangerous under such conditions. This will not involve the adoption of any very revolutionary or costly changes in the design of the smaller buildings. But, although the changes called for may not be revolutionary they are none the less imperatively necessary and to ignore this necessity is to invite disaster.

These changes cannot be set out in detail here, but the reports upon earthquake damage referred to will show, for example, the necessity for the limitation in height of buildings having bearing walls of brick or other unit block masonry, and the discontinuance in this type of building of the use of concrete floors; the necessity for the restriction of buildings complicated or irregular in plan or cross-section to those types of construction in which the consequent stresses can be calculated and provided against; the necessity for securing every element of a structure together securely and adequately so that the whole will act as a unit; the need for the abandonment of high, unsecured parapets and gable walls and of the use of the brick or other masonry arch as a structural support. In regard to this last it is worth noting that as early as 1857 the civil engineer Mallet, writing after his careful examination of the buildings damaged or destroyed in the great Neapolitan earthquake of that year, stressed the universal failure of the brick or masonry arch. This fact has been noted again and again since. In Napier, however, a building erected only a year or two before the earthquake, and having heavy concrete floors, had three of its external walls supported upon brick arcades. The complete destruction of this building was the cause of a lamentable loss of life.

I would like at this point to make quite clear that neither here, nor in the case of other failures or cases of failure, referred to as being due to the non-recognition of the possibility of earthquake shock, am I imputing blame to any individual, whether owner, architect or builder. The failure to recognise this possibility as a very real one in this country, and one to be prepared for in our buildings, was general; it was a community failure, the responsibility for which has to be borne by the community. Unfortunately it appears that the lesson has not yet been learned in places.

The foregoing remarks refer particularly to the smaller buildings in the towns and in the suburbs of our cities. In the case of the larger city buildings, to-day almost invariably of frame construction, either of reinforced concrete or steel, the position is in some respects very similar. Experience has shown that buildings well designed and well constructed for normal static conditions develop considerable resistance to earthquake shock, and their behaviour suggests that the change necessary to meet earthquake conditions does not necessarily

involve any revolution in constructional methods although a new force has to be recognised and provided against in the design analysis. The nature of this force and the methods of analysis must now be considered.

THE NATURE OF EARTH MOVEMENTS

According to generally accepted theory the outer surface or envelope of the earth is a crust of rock, perhaps some fifty miles in thickness, split up into huge irregularly shaped blocks of varying mass by planes of cleavage known as faults. This crust is in a state of tension and the stress is relieved from time to time by movements of rock masses along the fault planes. These movements may be vertical, horizontal or a combination of both, but in whatever direction the mass moves the movement sets up waves of elastic vibration in the surrounding mass. It is these waves of vibration acting at the surface of the earth upon which buildings are founded which are known as earthquakes.

The waves are of three kinds and it is of interest in passing to mention that it is this fact, and the fact that the waves arrive at any observatory at different time intervals after the generation of the shock, which enable observers to locate the place of origin of the disturbance. The scientific study of these waves presents some difficulty, but here we need only note that owing to several conditions peculiar to wave motion, namely, that waves may be superimposed upon one another, following simultaneously the same path, or crossing and re-crossing one another; that they may be refracted and reflected as they pass through media of varying density; that they travel with varying velocities; further, that the earthquake focus not being a point but a large plane surface or area, the waves proceed not from a point but upon a large wave front; owing to these conditions it is clear that at the earth's surface any particle has a very complicated movement. It is of importance to realise this, in view of the fact that it has been until recently accepted that the measure which best gives us the intensity of an earthquake shock is that of the acceleration of the earth particle. A formula for finding the acceleration of a particle from the observed period and amplitude of its motion may be found in any textbook of physics, but in order to use this formula without error several things are necessary. In the first place it must be known that the movement of the particle is truly that movement to which the formula relates—that known as Simple Harmonic Motion. It is doubtful, however, whether the movement of the earth particle in an earthquake is a Simple Harmonic Vibration. The experimental research work of Lydik S. Jacobsen and of F. J. Rogers (*Bulletin Seismological Society of America*, Vol. 20, No. 2) suggests that in certain classes of soil, of a loose incoherent nature, the motion is definitely not a Simple Harmonic vibration "but is a to and fro motion with very rapid reversals causing the accelerations to be almost independent of the frequency and amplitude." On the other hand, it must be said that some authorities are convinced that the movement of the earth particle is sufficiently near Simple Harmonic for acceptance in working formulæ. Even if it may be assumed, however, that the motion of the earth particle is a Simple Harmonic vibration, it is a fact that we have not yet, with perhaps one exception, the necessary instrumental data to enable us to use the formula with any accuracy in the case of earthquakes of disastrous intensity.

ANALYSIS OF EARTH MOVEMENTS

The seismographs which record the period and amplitude of the earth particle were invented for the purpose of scientific and not engineering research and efforts have been directed towards making them delicate and perfect for their work of recording earthquakes at a distance. From these records a great deal has been learnt about the constitution of the earth and other cognate matters of scientific importance. They have been designed for that purpose, and they record minute earth tremors with a very close approximation to the actual movement; but when a violent earthquake comes, even if there happens to be a seismograph in the area shaken it promptly goes out of action. I believe I am right in saying that there has only been one measurement by a seismograph of an earthquake motion in the actual area of damage in a disastrous earthquake, and that was for five seconds only in the University of Tokio during the 1923 earthquake.

Knowing, however, that seismographic records are being constantly made in some countries subject to earthquake shock we have accepted values of acceleration published in authoritative reports of recent earthquakes in those countries as being instrumental and therefore accurate records. But this is not the case. The given value of the acceleration of the ground in the area of damage is invariably an assumed value only, estimated from observations of results upon people and buildings made in the area and based upon some scale such as the Rossi-Forel. It may be an under- or over-estimate and may possibly be far from accurate. Attention is now being given to the design of Accelerometers to measure the acceleration directly.

Besides the misunderstanding which has resulted from this unconscious acceptance of values of acceleration which are not the product of the seismograph, as accurate data from which deductions as to values for engineering design may be made, there are other difficulties. It is a question whether the maximum acceleration is in itself, even if ascertainable instrumentally and with accuracy, the true measure of the destructive force of an earthquake—the predominant period or the amplitude may be the determining factor. The uncertainties involved in the whole matter of earth movements, their measurements and their destructive effects, are in fact at the moment sufficiently great to cause research workers in the field to seek for an entirely new method of approach to the problem in which the true ground displacement does not require to be measured or calculated. In this method the problem of aseismic design is

reduced to the computation or measurement of the vibration frequencies of a structure. It is impossible within the limits of this Paper to pursue this point. Sufficient has been said to show that there is yet a great deal of research needed as to the nature, form, and value of earth movements and their effects upon building structures before aseismic design can be placed upon a sound scientific basis. What I have said, however, must not be interpreted as suggesting that our knowledge to-day is so incomplete as to prevent the design of earthquake-resisting structures with reasonable assurance and economy.

A number of students of the problem in Japan, notably the Englishmen Milne and West and the great Japanese scientist, Dr. Omori, and others of his countrymen, endeavoured for many years to obtain a value of the destructive force of earthquakes for use in aseismic design, based upon methods of science and with the observed earth movements as the foundation assumption. As a result of their work a body of opinion had been formed in Japan prior to the disastrous earthquake of 1923 that buildings should be designed to resist an acceleration equal to one-tenth of the acceleration of gravity. From the preceding discussion it will be realised that this is possibly at the best an approximation only both as to the nature of the force to be resisted and its quantitative value. But it does not follow that data based upon theoretical investigations and shown by later research to be approximations only are therefore also shown to be useless. They are, on the contrary, the very substance of which knowledge is built up by a process of modification, reshaping and growth as new facts are discovered. They point the direction which investigations must take. When the earthquake of 1923 occurred there were a number of buildings in Tokyo which had been designed by a distinguished Japanese architect, Dr. Naito, upon this basis, which came through the ordeal practically undamaged, while many buildings of similar type, designed for ordinary loading only, failed. It must be mentioned that one building, the Japan Industrial Bank, an eight-storied structure, which had been designed by Dr. Naito for a seismic coefficient of 1/15 of the acceleration of gravity also stood practically intact after the earthquake. In the book by the late John R. Freeman, *Earthquake Damage and Earthquake Insurance*, which is a mine of information upon the subject, a remark made by a Japanese engineering authority, Professor Suyehiro, in the course of an address delivered to the American Society of Civil Engineers, is quoted. Professor Suyehiro said: "As a practical problem the actual fact that buildings designed upon the 0.1g. basis resisted this earthquake fairly well is a datum more valuable than any other arguments in an engineering design. There is nothing more important than this kind of practical data."

ASEISMIC DESIGN

In the absence of more accurate data and more complete knowledge it is now generally accepted that a building properly designed to resist a continuously applied horizontal force equal to approximately 0.1g., or one-tenth of the weight of the building above any point considered, will safely withstand an earthquake of high intensity. While we have here one solid fact which we may grasp and recognise as an important step in advance in aseismic design, we must be careful to accept it only for what it is, and preserve an open mind, ready to revise our data and our methods as the results of later research and experience become available. The difficulties inherent in the whole subject must be recognised as very great. It is in general impossible to produce the conditions in experimental investigation which are identical with those assumed in theoretical analysis and the final proof of a theory must await the test of actual earthquake. When this comes there are likely to be factors involved which complicate the matter and make an absolute verification of any theory difficult or impossible.

There is some ground for believing that the proper road of approach in aseismic design may prove to be by dynamics rather than by statics. Creskoff (*Dynamics of Earthquake Resisting Structures*) has pointed out that the dynamic theory of design, of which he is a supporter, explains some examples of observed damage in structures which are inconsistent with the static theory. According to the latter, for example, the greatest stresses in a building frame are at the base, but it has frequently been noticed that a building has suffered most damage somewhere between the lower third and middle points in its height. Analyses of frames according to the dynamic theory show that this might be expected.

At this point I may refer, too, to the difference of opinion which has found expression as to whether flexible or rigid frame is the better. Since the early days of the consideration of aseismic design, there have been some who considered that the solution of the problem lay in flexibility in a building frame rather than rigidity, that a structure should be designed so as to sway and bend in a shock without damage to itself. The ordinary wooden house which, with the exception of the brick chimney, has made such a good showing during earthquakes is actually an example of such a construction, although not completely flexible. It would doubtless be quite possible to design a flexible steel frame for the larger buildings, but practical considerations of the fire-proofing and protection of the steel, and the nature of the necessary facings and linings, make the completely flexible type of building an impossibility in the case of large and permanent structures. It has been suggested, however, that a form of construction for frame buildings in which the ground floor columns were relatively long and flexible and the walls intentionally weak, and the columns and walls above relatively rigid, is the solution for aseismic building. The theory is that the bending stresses caused by the earthquake movement would all be taken up by the lowest floor of the building, and it would thus be safe from damage or

destruction. Support has been found for this theory of design in some quarters and one Japanese engineer of standing, who has made a study of the problem, strongly advocates it. The weight of opinion is, however, against it. Professor Martel (*Bulletin Seismological Society of America*, Vol. 19, No. 3) has shown that analyses of frames of this type demonstrate its unsuitability; that in earthquakes having a period greater than the free period of a building—a condition considered to favour the theory—the acceleration of the upper portion is actually greater than if the ground floor columns were rigid, and that no release from stress is obtained. It may safely be said that the whole weight of authoritative opinion to-day is in favour of the rigid type of frame.

With the acceptance at the present time of the rigid type of structure as the correct one to adopt, of one-tenth of gravity or thereabouts as the correct seismic coefficient, and the statical as the right method of design, there yet remains the problem of the introduction of the new factors into the practical design of structures.

While methods of analysis for ordinary static stresses have become accepted and standardised, there is yet no generally accepted method of analysis for the combination of earthquake with the vertical forces. Yet again this does not mean that we can do nothing. Certain practical methods which give without doubt results within a reasonable degree of accuracy have been suggested by several persons. It is impossible within the limits of this paper to enter into any full discussion of any one of these. I must refer those interested to sources where they can read first hand the several authors' methods with their explanations. In the office of my firm we have adopted that of Dr. Naito.

Dr. Naito's method of design embraces the principle of distributing the earthquake force through a building in accordance with the relative rigidity of the parts thereof, making use of "distribution coefficients."

In my judgment, any method of analysis which ignores the fact, common to almost all buildings, that some portions of the frame are more rigid than others, and will, therefore, offer greater resistance to the earthquake force than other portions, is fundamentally unsound. The relatively more flexible elements of the frame are able to deflect sufficiently to relieve themselves of a portion of the load and cause it to be borne by the more rigid elements. Dr. Naito's method permits a rational analysis of the relative rigidities to be made, sufficiently near to accuracy to enable reasonable evaluation of distribution coefficients, without undue labour or difficulty, and is another step in advance in aseismic design. But, in the use of the method, one point must be particularly noted. As in other methods of analysis, the floor system is considered as a horizontal diaphragm transmitting the stresses from element to element of the frame. It is, then, imperative not to overlook the possible torsional stresses caused by the passing of the vibrations in different phases from rigid to flexible, or from flexible to rigid, elements. The floor system will usually take care of these stresses without any increase of resistance, but the necessary check should always be made. The value of diagonal bracing in the floor system is worth noting.

By taking advantage in the design of every rigid portion of the structure, *e.g.*, the walls of lift wells, any permanent subdivisions, wall spandrels, etc., the calculated bending stresses in the columns are much reduced and a considerable saving in size of columns and, therefore, in floor space and in cost is effected. In the office of my firm, the present practice is that after the calculation of the relative stiffness factors, and the determination of the distribution coefficients, the stresses throughout the structure are then calculated by the Hardy Cross method of moment distribution. "The method in general involves the calculation of moments at the ends of all beams in a frame under certain artificial conditions of restraint, then a redistribution of unbalanced moments by arithmetical proportion when the artificial restraints are removed."* The calculations can be carried to any degree of accuracy desired. Dr. Naito himself uses a modified portal method. Those who wish to pursue this matter further are referred to the sources listed at the end of this paper.

PRACTICE AND ASEISMIC DESIGN

Whatever method of design is adopted, designers must realise the imperative necessity of considering the provision of resistance to earthquake at the earliest moment in the preparation of plans; many hours of labour may thus be saved. The new requirements may vitally affect or even totally change the first proposed solution of a problem. Architects must be careful not to commit themselves to their clients with a detailed plan until a full preliminary consideration of the problem from the engineering side has been made. Great economies may be effected by a thoughtful disposition of walls, beams and columns and of the plan as a whole. Whenever possible, a building should be planned so that it may possess approximately equal strength about its centre of mass and a symmetrically disposed bracing system be possible. When a building of irregular or complicated plan or cross section is rendered necessary by the conditions, then the designer must take into account the consequent torsional or other stresses in the different parts of the structure and make provision for resistance accordingly. This will give opportunity for the exercise of the designer's knowledge of fundamental principles, and of his powers of judgment, and at times will doubtless severely test that knowledge and that power. Another point: some architects are inclined to change plans in the course of their development more than is, perhaps, necessary, but changes in monolithic design are likely to be a very costly thing to the designer, for the calculation of the stresses in a complete frame across a building is a very laborious and tedious task, involving many hours of labour.

* Hardy Cross, *Continuous Frames of Reinforced Concrete*, p. 81.

It must be remembered, too, that while a competent structural engineer can solve very difficult problems, yet unusual forms of construction, which in any case tend to be very costly, are particularly so in earthquake-resisting design. Modernistic staircase windows and similar features, involving a complete break in the structural frame from top to bottom of the building, are not very logical when designing for these conditions.

I shall have failed in what I have said if I have not conveyed to you that in the larger, as in the smaller, buildings, and altogether apart from the question of the calculation of the stresses in the frame, aseismic design, properly understood, will embrace many practical considerations and give ample scope for the exercise of the skill and judgment of the designer. For example, it is obvious that as the earthquake force is directly affected by the weight of a structure, and of the loads carried by it, any addition of weight to either dead or live load adds to the stress which the building is called upon to resist, and consequently to the cost of the same. This suggests the consideration and the adoption wherever possible of any of the new materials or methods which reduce the dead weight of the structure, and the need of careful consideration of design of live loads.

With regard to the actual work of design, I would like to quote from the work of Hardy Cross upon "Continuous Frames of Reinforced Concrete." Professor Hardy Cross is an engineer to whom geometrical analysis presents no difficulties and to whom mathematics is doubtless a recreation, yet he gives this warning which may well be applied to aseismic design: "One of the greatest problems in this field, as it has been in all fields of structural work, is to simplify the principles at both ends so as to make it possible for a man to correlate his knowledge. The analysis of a structure for continuity should be less complicated than are the determination of anchorage and stirrup spacing under some specifications. Many writers on the subject seem to have held a strange philosophy which attempts to substitute exact rules in every detail for the judgment of the designer. Some rules must check judgment, but there is not and will never be any substitute for the sound judgment of the designer. All that we can hope to do is to furnish simple and usable tools of analysis as aids to that judgment. Analysis must be thought of as a guide to judgment, not as a substitute for it." An English engineer, Haddon C. Adams, in a recently published work gives a similar warning: "The most complicated method will not always yield the surest result. There is always a danger of being lulled into a false sense of security by abstruse mathematics—there is no magic charm in complicated and intricate computation; there is indeed some danger, and the safest guide in most matters is to cling fast to common sense."

I am of opinion that so long as the need for the provision throughout a structure of resistance to a horizontal force is recognised and acted upon the value of that force to be adopted in design need not be assumed at too high a figure. I believe that 0.08g. is sufficient. Nor, in view of the many uncertainties involved, are very exact mathematical analyses necessary in practical design, although quite necessary in research work. In aseismic design sound knowledge of the principles involved is imperative, but in the application of those principles to practical design wise judgment and common sense are the first requisites. I need not add that this must be the judgment and common sense of the trained man with a sound knowledge of fundamental principles and methods. It is he alone who can judge when an approximation is safe and when an exact analysis must be made, although made with a full knowledge of the limitations of the assumptions upon which such an analysis is based.

Just as further research is necessary as to the fundamental assumptions of earth movements so it is also in regard to the methods of analysis and design. As in the case of ordinary reinforced concrete design, for example, approximate values of bending moments have long been used which give perfect safety with reasonable economy, so research engineers must be called upon to assist those engaged in the work of practical aseismic design by evolving, wherever possible, simple methods and safe approximations which will reduce unnecessary work to a minimum. I view this as an important piece of work in the field of engineering research to which time and thought should be devoted in the immediate future.

ECONOMICS OF ASEISMIC DESIGN

There is one point which needs emphasis and must be the subject of careful study, and that is the economic question. Earthquakes are fortunately a comparatively rare phenomenon in any one place. Immediately after the occurrence of an earthquake everyone is prepared to insure their building at a high premium, to discuss seriously preparations to resist earthquakes in new buildings and to pay for both quite cheerfully. As the earthquake recedes into the distance, however, a complete change occurs. The lessons are forgotten, the earthquake insurance is abandoned, and it is sometimes a difficult matter to persuade building owners to expend money in preparing for what is, they think, an uncertain and remote contingency. It becomes a serious matter then to know and be able to state frankly what is the additional cost involved in designing to resist earthquakes. There has been altogether too much loose talk on this point. Enthusiasts have made claims that the cost is negligible. It has been said that the saving effected by the omission of unnecessary ornament would cover the additional cost in the structural work. It has been said, also, that the increased stresses permissible under new building codes will compensate for the additional cost. Neither of these claims can, however, be sustained. Architects are not unmindful of the modern movement, nor are they ignorant of the

economics of modern building. Apart altogether from the question of earthquakes in the building of to-day, ornament is being reduced to a minimum and all structural features are being reduced in size and weight as far as is possible. The increased permissible stresses are due to improvements in materials and growth in knowledge, and apply altogether apart from earthquake resisting design. To introduce them into the matter is very disingenuous. Surely the only true basis of comparison is that of two designs for a given structure both executed with exactly the same skill and knowledge, and each subject to precisely the same governing conditions, except in the case of one the inclusion in the design of provision for earthquake resistance. And it is obvious that the provision for resistance to an additional force of some magnitude must mean added cost. Dr. Naito states, and he is, perhaps, more nearly correct than those who take too optimistic a view, that the additional cost of designing a building to resist a horizontal stress of one-tenth of gravity is approximately 10 per cent. upon the total cost of the building, although it would obviously vary with varying conditions. Further investigation is, however, required so that accurate information may be forthcoming, but I submit that correctly viewed the whole idea of "extra" cost is wrong. If aseismic design is necessary then any cost involved is no more an extra cost than is the cost of resisting the force of gravity, or that of the provision of sanitation and hot-water heating.

CONCLUSION

To sum up, earthquakes are a more common phenomenon than is usually recognised. In the light of present knowledge it is definitely possible to design buildings to resist earthquake shocks of great intensity at a reasonable additional cost. Moreover, not to do so is, in New Zealand at least, to invite disaster. A great deal can be done to make buildings safer by simple changes in practical building construction based upon the lessons of the past. In the case of the larger buildings data is available to make the analysis of aseismic building frames possible. Nevertheless our knowledge as to the nature and extent of earth movements is incomplete and further research work is urgently necessary. The continuance of such experiments as those of Jacobsen and Rogers referred to in the paper is desirable, and the development and installation at suitable stations of instruments capable of directly measuring earthquake movements of great intensity should be proceeded with. The effect of discontinuity between the foundation and the soil and method of effecting it should be studied. Experiments upon scale models of buildings prepared after careful investigation of the special problems involved, and upon actual full-scale elements of buildings, tested upon shaking tables, would produce valuable data for the designer. There is a big field for research into the problem of the analysis of building frames when subjected to earthquake force. Such research should in particular be directed towards the development of safe and economical but speedy practical methods of design. The aseismic factor has added to the cost both of the design and of the structure. This cost will vary according to the particular condition. In a country where aseismic design is vitally necessary, however, this cost should not be regarded as an "extra" cost in a building any more than that of the provision of any other necessity in plan or structure.

SHORT LIST OF SOURCES FOR FURTHER STUDY

The Bibliography of Seismology, with its many related subjects, now runs into thousands of references (see, *e.g.*, *Publications of the Dominion Observatory Ottawa, Bibliography of Seismology*). The following gives only a list of recent publications easily obtainable and of immediate practical use.

J. J. Creskoff. Dynamics of Earthquake Resistant Structure.

S. Irwin Crookes, Junior. Bulletin No. 20, August 1932, Auckland University College (University of New Zealand). Earthquake Resisting Construction—The Japanese Methods of Calculation. (A small but useful compilation.)

Report of the Building Regulations Committee. New Zealand, 1931.

(*Note.*—At the request of the N.Z. Government a committee of the New Zealand Standards Institution is preparing a Standard Building Code for New Zealand covering earthquake resisting construction and which is based partly upon the above.)

New Zealand Institute of Architects (Incorporated). Provisional Report on Modification of Existing Structural Systems to Provide Greater Resistance to Earthquake Shocks. August 1931.

Peter Holgate. Building Construction to Resist Earthquake. (Proceedings New Zealand Soc. C.E., Vol. XIX. 1933.)

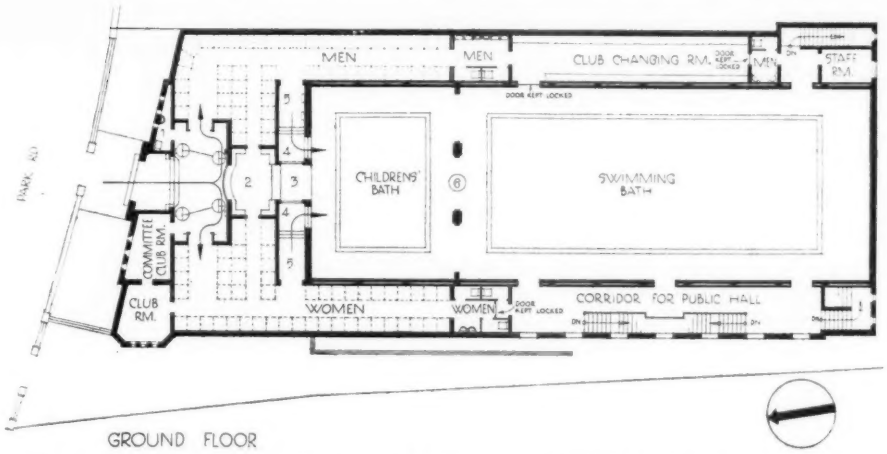
H. C. E. Cherry. The Influence of Earthquake on Structural Design. (Minutes of Proceedings of the Inst.C.E., Vol. 236, 1934.)

F. W. Furkert. The Effects of Earthquake on Engineering Structure. (Minutes of Proceedings of the Inst.C.E., Vol. 236, 1934.)

J. J. Booth. The Design of an Earthquake Resisting Structure: The Dominion Museum, Wellington, N.Z. (Minutes of Proceedings of the Inst.C.E., Vol. 236, 1934.)

C. R. Ford. Earthquakes and Building Construction (1926). (An elementary introduction to the subject.)

C. W. Hamann. An Introduction to the Earthquake Resistance of Structures. (Journal of the Institution of Structural Engineers, Vol. XII, No. 12, December 1934.)



The ground floor plan showing circulations. Reference : 1. Staff lavatory. 2. Towel store and tickets. 3. Attendants and refreshments. 4. Foot bath. 5. Foot sprays and showers. 6. Aeration fountain

BATHS AT SHIREHAMPTON, BRISTOL

Architect: C. F. W. Dening, R.W.A. [F.]

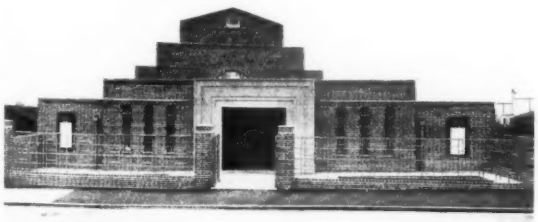
This small swimming bath is an example of a type particularly suited to suburban communities; it is one of several that are being provided by the Corporation of Bristol. The principal requirements are that the building shall be capable of occasional use as a public hall; that it shall be reasonably inexpensive in first cost, and that attendance and labour charges be reduced as much as possible.

THE PLAN

Although affected by an awkward site, the plan—particularly in its circulations—is likely to serve as a model. This is so arranged that the whole building can be run and supervised by from two to four persons according to the numbers using the bath. The arrangement of the office enclosure is such that from it the turnstiles and the issue of towels can be operated, the attendants can have a full view of both baths, and refreshments can be sold to bathers. The whole of the plant is automatic in operation, requiring only occasional attention, the heating being on the electric thermal-storage system. Thus during slack times the bath can be run by one man and one woman, additional attendants being required for the bathing cabins only during busier hours.

The dressing accommodation is divided so that the men's and women's departments are on opposite sides of the building. Each department has the usual shower and footbath approach which must be used by all bathers, and a room for the use of clubs. Additional lavatories, with access from the bath, are also provided; these are principally of use when the building is used as a public hall.

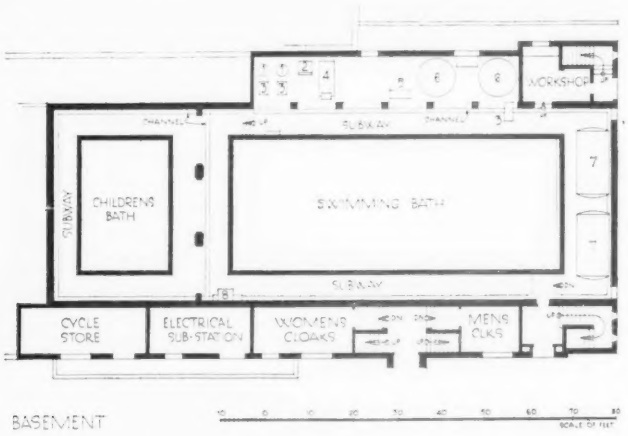
The tradition that a bath building shall be usable as a public hall in the winter is tending to die out, but has influenced this building to some extent. Although a separate entrance on the long side was provided, the main interior has been planned and finished with bath and not auditorium conditions in view. The growth of swimming as a winter recreation is tending to do away with the dual-purpose bath building, which, since good conditions for a bath and an auditorium are almost irreconcilable, is a good thing.



General view from the street. The bricks are textured ("ripple") and brindled, the masonry in grey Forest of Dean stone

THE STRUCTURE

The structure is on accepted lines, as follows: the pool is of reinforced concrete and surrounded by an access passage, this passage having floor channels in which all pipes, including R.W.P.'s discharge ; the roof is of steel trusses supported on stanchions, giving a large air-space between the ceiling and the roof, which helps to prevent condensation; the walls are of brick and except between stanchions are weight bearing.



BASEMENT

The basement plan. Reference: 1. Electric heater. 2. Control panel. 3. Pump. 4. Domestic supply cylinder. 5. Air compressor and motor. 6. Filter. 7. Electric thermal storage cylinders. 8. Main switchboard

A feature of the building not apparent in the photographs is the good colouring. The bath surround is of white ribbed tiles with black borders; the black is picked up in the glazed brickwork of the walls in the skirtings, dado lines and door surrounds. The dado itself is of rich blue glazed bricks, and the main walling of pale grey. The curved ceiling is painted daffodil yellow on a structure of fibrous plaster ribs and insulating wallboard. The pinhead glass laylight has borders of pale blue glass.

The dressing rooms have walls of yellow glazed bricks (exactly matched by the colour of the sanitary fittings) and dark grey floor tiles (Duromit); the dressing boxes, which are collapsible, are of Japanese oak.

EQUIPMENT

The filtration and chemical treatment plant is of the usual type and, with the electric thermal-storage plant, is placed in the basement. The heating of the bath hall and dressing-rooms is by warmed air. Unit heaters, each consisting of a fan and heating coil, are fixed on the ceiling of the subway from which they draw air, discharging it warmed into the bath hall at two levels in the walls. Vitiated air is drawn out through grilles in the ceiling by fans in the back gable wall, the whole roof space acting as a vent trunk; this is an important factor in preventing ceiling condensation.

Artificial lighting is by means of port lights in the ceiling. A travelling gantry in the roof space allows easy cleaning of the glass and relamping of the light units.

It will be seen that, with the exception of the small amount in the roof space, the whole of the mechanical equipment is in the basement.

The diving stage is an interesting design of three fixed boards on one side and three springboards on the other, none being superimposed. Diving from the bath edge under the boards is prevented by railings which can, however, be removed for relay races. The whole diving stage is in sections bolted together and can be completely removed should the building be used as a public hall. The metal work is finished with matt aluminium paint and polished stainless steel.

The Quantity Surveyors were Messrs. Gleeds of Bristol.

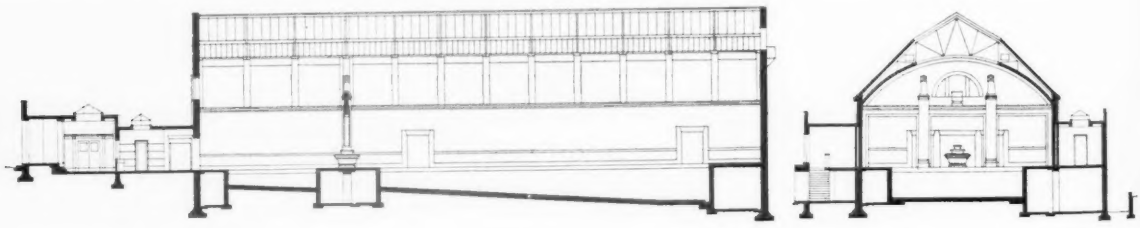
CONTRACTORS AND SUPPLIERS OF MATERIALS

GENERAL CONTRACTORS: C. A. Hayes and Sons, Bristol.

STRUCTURE: Structural steelwork, Gardiner Sons and Co. Reinforced concrete, L. Mouchel and Partners and the British Reinforced Concrete Co., Ltd. Bricks, The Cattybrook Brick Co., Ltd. Structural floors, the Caxton Floor Co. Grey Forest of Dean stone, J. Cox. Glazed bricks, The Stourbridge Glazed Brick Co. Reconstructed stone in screen and fountain, The Bristol Stone and Concrete Co., Ltd.

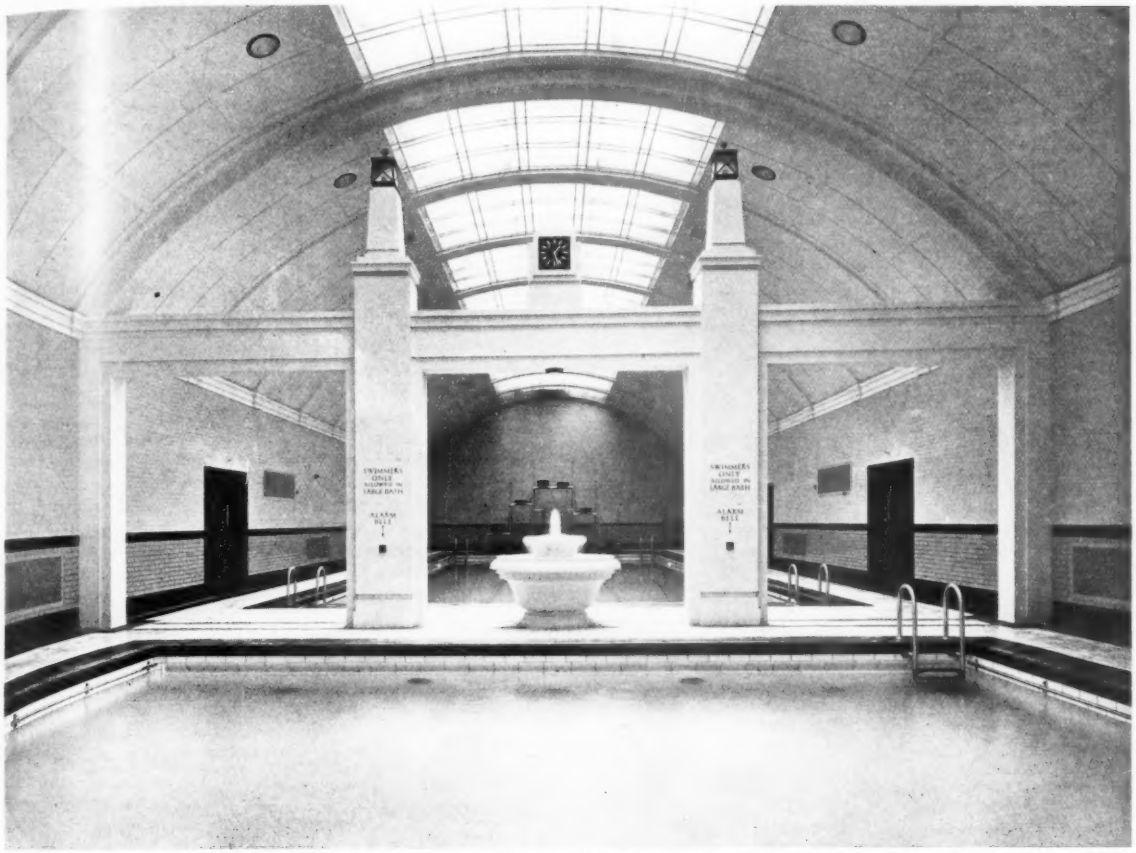
STRUCTURAL FINISH: Black and white floor tiles, John Boulton and Co. Mosaic floor, The Bristol Marble Mosaic Floor Co. Floor tiles (Duromit), The Kleine Co., Ltd. Joinery, E. J. Harris. Fibrous plaster, Crang and Plucknett. Asphalte, The Western Trinidad Asphalt Co. Curb to baths and channels, Diespeker and Co., Ltd. Roof tiles, Colthurst Symons and Co. Roof tiling, Chas. Cornish and Co. Windows and laylights, Gardiner Sons and Co., Ltd. Patent glazing, Mellowes and Co.

EQUIPMENT: Purification plant, The Horseley Bridge and Thomas Piggott, Ltd. Heating, G. N. Haden and Sons, Ltd. Lighting, The Colston Electrical Co. Vent trunks, F. Braby and Co. Door furniture, C. E. Tucker. Plumbing, Arthur Scull and Sons. Diving stage, Llewellin's Machine Co. Steps and handrails to bath, F. H. Dunn and Sons.



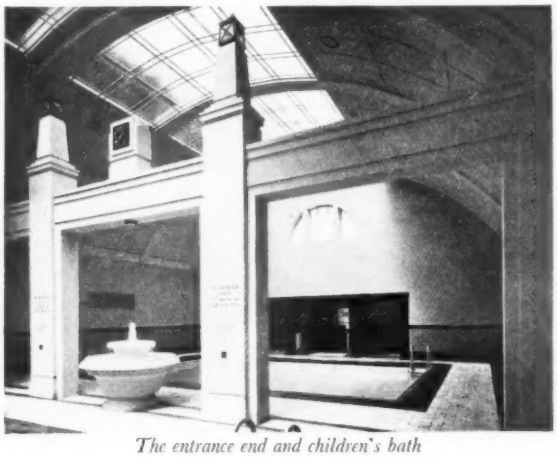
LONGITUDINAL SECTION CROSS SECTION

Longitudinal and cross sections. The site slopes steeply from the road



General view from the children's bath. The colouring of the interior is an important feature of the building. The walls are in blue and grey with black borders, the floor is black and white and the ceiling daffodil yellow. The screen is of reconstructed stone

The swimming bath. Artificial light is by ceiling ports



The entrance end and children's bath

Review of Periodicals

Attempt is made in this review to refer to the more important articles in all the journals received by the Library. None of the journals mentioned are in the Loan Library, but the Librarian will be pleased to give information about prices and where each journal can be obtained. Members can have photostat copies of particular articles made at their own cost on application to the Librarian.

UNIVERSITY BUILDINGS

ARCHITECTS' JOURNAL. *Vol. LXXXI. No. 2105. 23 May. P. 807.*

Liverpool University Students' Union. Extension by C. H. Reilly, L. B. Budden and J. E. Marshall.

EXHIBITION BUILDINGS

ARCHITECTURE (PARIS). *Vol. XLVIII. No. 5. P. 145.*

Paris Exhibition, 1937. Designs for decoration of the Pont de l'Alma and Pont de Passy, and designs for the Exhibition Gardens.

KENTIJU SEKAI (TOKYO). *Vol. XXIX. No. 4. April.*

The 1935 Yokohama Exhibition. Illustrations of the buildings.

CASA BELLA (MILAN). *Vol. VIII. No. 89. May. P. 4.*

The XVI Trades Fair, Milan. Description and photographs of the buildings and stalls. Many excellent buildings and good imaginative display.

The same number illustrates the Brussels Exhibition.

CIVIC

ARCHITECT AND BUILDING NEWS. *Vol. CXLII. No. 3466. 24 May. P. 214.*

BUILDER. *Vol. CXLVIII. No. 4816. 24 May. P. 965.*

Wembley Municipal Offices. Competition designs.

ARCHITETTURA. *Vol. XIV. Part 13. No. 4. April. P. 205.*

New buildings at Sabaudia, the city on the reclaimed Pontine marshes. Article illustrates the hospital, the cemetery and various municipal offices. Well illustrated.

BOUWKUNDIG WEEKBLAD ARCHITECTURA. *1935. No. 22. 1 June. P. 221.*

New Council Chamber, Utrecht (F. Spanjaard).

ARCHITECTURE (PARIS). *Vol. XLVIII. No. 5. P. 159.*

Boulogne-sur-Seine, Hôtel de Ville, by Tony-Garnier.

SPORTS BUILDINGS

JOURNAL OF ROYAL ARCHITECTURAL INSTITUTE OF CANADA. *Vol. XII. No. 5. May. P. 80.*

Gymnasium group, McGill University, Toronto, competition designs (A. J. C. Paine, M.R.A.I.C., winner).

ARCHITETTURA. *Vol. XIV. Part 13. No. 4. April. P. 193.*

"Il Golf dell' Ugolino." Golf Club near Florence (G. Bosio), modern buildings with all the usual accommodation, also swimming bath.

BUILDER. *Vol. CXLVIII. No. 4816. 24 May. P. 965.*

Sports Pavilion, Stowe School (R. Fielding Dodd [*F.*]).

TRANSPORT BUILDINGS

ARCHITETTURA. *Vol. XIV. Part 13. No. 4. April. P. 223.*

Winning competition design for station buildings, Linate Aerodrome, Milan. Architect, G. Giordani.

JOURNAL OF INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS. *Vol. LXI. No. 24. 21 May.*

Waterloo Bridge, article on demolition.

MASTER BUILDER. *Vol. XL. No. 874. May. P. 159.*

Citroën Building, Brussels (Dumont and van Goethem).

RESTAURANT

ARCHITECTS' JOURNAL. *Vol. LXXXI. No. 2105. 23 May. P. 807.*

ARCHITECT AND BUILDING NEWS. *Vol. CXLII. No. 3466. 24 May.*

Restaurant at Whipsnade Zoo (Lubetkin, Drake and Tecton), a simple reinforced concrete structure.

CONCERT HALL

ARCHITECTURE ILLUSTRATED. *May 1935.*

Concert Hall, Infectious Diseases Hospital, Derby (C. H. Aslin [*F.*]). Small hall with stage, kitchen and green room.

CHURCHES

ARCHITETTURA. *Vol. XIV. Part 13. No. 4. April. P. 248.*

Funerary chapels at Velletri (A. Petrignani), and at Verano (G. Bianchi), Italy.

DOMESTIC

DESIGN AND CONSTRUCTION. *Vol. V. No. 7. May.*

Special Flats number with articles on recent buildings by Mr. L. W. Thornton White [*A.*]; on types and layout by Mr. T. P. Bennett [*F.*]; on steel frame construction and on soundproofing.

CASA BELLA (MILAN). *Vol. VIII. No. 89. May.*

General plan, illustrated by models, for a residential colony, Leipzig-Gohlis. Also illustrations of executed domestic work by Luckhardt and Anker, work which is probably too uncompromisingly modern to be favoured in modern Germany.

BOUWKUNDIG WEEKBLAD. *1935. No. 19. 11 May. P. 197.*

Two recent houses by Brinkman and van der Vlugt at Rotterdam.

BAUMEISTER. *Vol. XXXIII. No. 6. June. P. 207.*

Private house gardens in Vienna, Switzerland, Germany.

MATERIALS

BUILDING. *Vol. X. No. 5. P. 196.*

Buildings in Holland by J. de Bie Leuveling Tjeenk illustrating particularly the use of brickwork in modern building. Illustrations of an Amsterdam warehouse in brick-faced concrete; an office building in Delft; the second building for the Annual Fair at Utrecht.

BYGGMÄSTAREN ALLMÄNNA UPPLAGEN. *Vol. XV. No. 10. 8 May. P. 83.*

Insect damage to timber. Article on timber pests by Professor I. Trägärdh.

EQUIPMENT

CONSTRUCTION MODERNE. *Vol. L. No. 32. 12 May.*

Loose Supplement on Refrigeration with descriptions and illustrations of modern large refrigeration plants. A useful reference.

DRAINAGE AND SANITATION

JOURNAL OF THE INDIAN INSTITUTE OF ARCHITECTS. *Vol. I. No. 4. P. 123.*

Sewage and sewage disposal. Article by M. M. Parmar.

TOWN PLANNING

CASA BELLA (MILAN). *Vol. VIII. No. 89. May.*

Replanning the Potsdammer Platz and Alexander Platz, Berlin. Illustration and description of Luckhardt and Anker's schemes.

Accessions to the Library

1934-1935—VII

INCORPORATING NOTES ON RECENT PURCHASES

(These Notes are published without prejudice to a further and more detailed criticism.)

Lists of all books, pamphlets, drawings and photographs presented to, or purchased by, the Library are published periodically. It is suggested that members who wish to be in close touch with the development of the Library should make a point of retaining these lists for reference.

Books presented by Publisher or Author marked R.
Books purchased marked P.
* *Books of which one copy at least is in the Loan Library.*

ARCHITECTURE

GENERAL

*A number of extra copies of works in great demand have been added to the Loan Library.

SOCIETATEA ARHITECȚILOR ROMÂNI, *Bukarest*
Arhitectura. 1934. 12½″. Bukarest. R.

HISTORY

ARCHITECTURAL ASSOCIATION
Exhibition of buildings designed and erected during the past three years by architects trained in the A.A. Schools and members of the school staff, *etc.*, *catalogue*. pam. 8½″. Lond. 1935. R.

BUND DEUTSCHER ARCHITEKTEN
Bau-Wettbewerbe. E. Deines, *ed.* [Monthly monographs on German competitions.] Nos. 22–23 (Jan.–Dec.) 11″. Karlsruhe. 1928.
Presented by Mr. A. E. Martin-Kaye.

VILLEURBANNE, *France*
Villeurbanne 1924–1934. Dix ans d'administration.
10¾″. 438+xx pp. [Villeurbanne: Municipality.] 1934. (£1.) P.

PROFESSIONAL PRACTICE

WORSFOLD (*Sir* T. CATO)
The Law of repairs and dilapidations. 2nd ed. 1934. R.

MORALES DE LOS RIOS (ADOLFO)
A Regulamentação da profissão de arquitecto.
7¼″. 191 pp. Rio de Janeiro: Borsoi & C. 1934.
Presented by the Author.

R.I.B.A.
Professional conduct and practice.
VIII. [March.] 13″. Lond. 1935.

EVERSHED (W. L.)
Specifications for building works.
2nd ed. 7¼″. x+166 pp.+front. Lond.: Pitman. 1935. 5s. R.

GOLDSMITH (GOLDWIN)
Architects' specifications—how to write them.
11″×8½″. xii+131 pp. New York: J. Wiley and Sons. 1935. 12s. 6d. R.

KIRBY (R. S.)
The Elements of specification writing.
4th ed. 9″. xii+168 pp. New York: J. Wiley and Sons. 1935. 10s. R.

DAVIES (B. PRICE)
*Specification for houses. Compiled with special reference to damp and weather-proof construction.—Schedule No. 2.
13″. 72 pp. Cardiff: Bldg. Estimator Pubns. 1935. 5s. P.(2).

BUILDING TYPES

(CIVIL)

LOUKOMSKI (G. K.)
Les Théâtres anciens et modernes.
10¼″×8″. 39 pp.+lxxxviii pls. Paris: Firmin-Didot. [1935.] (15s.) P.

(EDUCATIONAL)

AMERICAN ASSOCIATION OF MUSEUMS
The Museum News, *journal*. Vol. X, Nos. 10-11 (15 Nov. & 1 Dec.). 1934.
(*Containing:* Cret (P.P.). Theories in museum planning.)

ESDAILE (ARUNDELL)
National libraries of the world.
8¼″. xii.+386 pp.+xxxi pls.+vi maps. Lond.: Grafton. 1934. P.

(DOMESTIC)

GREAT BRITAIN: PARLIAMENT—BILLS
Housing Bill. (As amended by Standing Committee A.) [Bill 63.]
10¾″. Lond. 1935. 1s. 6d. P.

DETAILS

PERRAULT (CLAUDE)
A Treatise of the five orders (of columns, *first title*) in architecture, *etc.* Trans. by John James. *With* a discourse concerning pilasters: (by John Sturt). (*Two title-pages.*)
2nd ed. fo. Lond. 1722. *Presented by Mr. Frank Elgood* [*F.*].

D'ALBON, *Marquis*
Les Peintures du Château de Saint-Marcel-de-Félines en Forez. Claudius Varagnat, *illus.*
9″×7¼″. (iv)+40 pp.+pls. Gap: Jean. 1935.
Presented by Mr. P. J. Patrick through Mr. A. L. N. Russell [*F.*].

FAVIER (JEAN)
Le Mobilier religieux moderne.
post. fo. 12½″. text+48 pls. Paris: Alexis Sinjon. [1935.] (£1 12s. 6d.) P.

DERRICK (FREDA)
Tales told in church stones. Symbolism and legend in mediæval architecture and handicrafts.
8¾″. 128 pp.+front. Lond.: Lutterworth Press. 1935. 5s. P.

ALLIED ARTS AND ARCHÆOLOGY

DOWLING (H. G.)
A Survey of British industrial arts.
11″×8¾″. 55 pp.+front.+c pls. Benfleet, Essex: F. Lewis (Pubrs.), Ltd. 1935. £1 1s. R.

VENTURI (A.)
Storia dell'arte italiana.
X. La Scultura del cinquecento. Part 1.
10″. Milan: Hoepli. 1935. (£3.) P.

RICE (D. TALBOT), *editor*
Russian art. (By various authors.)
7½″. viii+136 pp.+xii pls. Lond. & Edin.: Gurney & Jackson. 1935. 2s. 6d. P.

ZERVOS (CHRISTIAN)
L'Art de la Mésopotamie, *etc.*
12½″. (264 pp., including double pls., all unnumbered.) Paris: Cahiers d'Art: Lond.: Zwemmer. [1935.] (£1 16s.) P.

PORTER (A. KINGSLEY)
Spanish Romanesque sculpture.
2 vols. 12¾″. Florence: Pantheon: Paris: Pegasus Press. [1928.]. (£6 6s. the 2 vols. remaindered.)

MEŠTROVIĆ (IVAN)
Meštrović. (Introds. by I. M—— and E. H. R. Collings. I. M—— and others, *editors*. Text trans. by J. Torbarina.)
11½″×9″. 17 (+16) pp.+front+cxvi pls. (double). Zagreb: Nova Europa. 1932. (15s.) P.

MACALISTER (R. A. S.)
Ancient Ireland.
7¼″. xii+307 pp.+pls.+folding map. Lond.: Methuen. 1935. 10s. 6d. P.

BUILDING SCIENCE

STRUCTURAL MECHANICS

SUTHERLAND (HALE) AND BOWMAN (H. L.)
An Introduction to structural theory and design. Theory.
2nd ed. 9″. New York: J. Wiley; Lond.: Chapman & Hall. 1935. 17s. 6d. R.

INDUSTRY

BUILDING INDUSTRIES NATIONAL COUNCIL
Annual meeting of the Council.
pam. dupl. typescript. 13″. Lond. 1935. R.

MATERIALS

COPPER DEVELOPMENT ASSOCIATION
Some facts about copper sheeting, *etc.*
pam. ob. 5″×9″. Lond. [1935.] R.

CONSTRUCTION

BRITISH STANDARDS INSTITUTION
*B.S.S. 449 for the use of structural steel in building. Draft.
pam. 8½″. Lond. 1935. R.(2).

SANITARY SCIENCE

CANESI (GIOVANNI) AND RAMELLI (A. C.)
Architetture luminose e apparrecchi per illuminazione.
10¾″×8½″. 162+(4) pp., mostly pp. Milan: Hoepli. [1934]. (£1 9s.) P.

ILLUMINATING ENGINEERING SOCIETY
*The Natural Lighting of schools.
*The Artificial Lighting of schools. (Reports of Sub-Committees.)
*The Artificial Lighting of libraries. (With Library Association.)
(*All from* Jnl. of Good Lighting, July.)
extract. 13″. Lond. 1931.

GRIEVESON (C. J. W.), *editor*
A Symposium on illumination. [By various authors.]
8½″. xv+229 pp. Lond.: Chapman & Hall. 1935. 13s. 6d. R.

TOPOGRAPHY

COHEN-PORTHEIM (PAUL)
The Spirit of London.
8½″. xii+116 pp.+pls.of 144 illus. Lond.: Batsford. 1935. 7s. 6d. R.

MIDDLESBROUGH. *Corporation of the City of*
Middlesbrough. Pictorial—industrial. Harold Hood, *ed.*
9¾″×9″. 116 pp., incl. pls. Middlesbrough. 1934. 3s. 6d. R.

TOWN AND COUNTRY PLANNING

ADAMS (THOMAS)
*Outline of town and city planning.
9¼″. (i)+368 pp.+pls. Lond.: J. & A. Churchill. 1935. 18s. R. & P. (2).

TOUT (T. F.)
Mediæval town planning. A lecture.
New ed. 9″. (vi)+34 pp.+xi pls. Manchester: U.P. 1934. R.

COUNCIL FOR THE PRESERVATION OF RURAL ENGLAND
*Memorandum (No. 37) on ribbon development and the legislative remedy.
pam. 8½″. Lond. 1935. R (2).

GREAT BRITAIN: PARLIAMENT—BILLS
Restriction of ribbon development. [H. L.] (59.)
pam. 10¾″. Lond. 1935. R.

PURDOM (C. B.)
*The Building of satellite towns.
9½″. Lond.: Dent. 1925. 10s. (second-hand). P.

GARDENS

QUEEN'S INSTITUTE OF DISTRICT NURSING
The Gardens of England and Wales. Pref. by Christopher Hussey. 1935.
Illustrated ed. 7¼″×5½″. Lond.: Cy. Life. [1935.] 1s. P.

TAYLOR (G. C.)
Garden making by example.
2nd ed. 9¼″. viii.+172 pp.+pls. Lond.: Country Life. 1935. 6s. P.

JEKYLL (GERTRUDE) *and* WEAVER (*Sir* LAWRENCE)
*Gardens for small country houses.
6th ed. 11″×8¼″. 1+262 pp.+front. Lond.: Country Life. 1927. 15s. P.

SOCIETIES

METROPOLITAN PUBLIC GARDENS ASSOCIATION
Report: 45th, for 1933 and 1934. pam. [1935.]

PERIODICALS

INSTITUTE OF LANDSCAPE ARCHITECTS
Landscape & garden.
Yearly volume, 1934. 10¼″ × 8¼″. Lond.: Garden Publns., Ltd., 4 Bedford Square. Yearly vol. 15s., annual subscription 10s., each issue 2s. 10d. (post free).
Quarterly. In progress.

MANUSCRIPTS

CLARKE (CHARLES)
An Investigation into the mechanical science and historical descent of architecture in England during the middle ages—*etc.*
Apparently never published. MS. sm. fo. [*c.* 1800].
Presented by Mr. G. J. Newman.

DRAWINGS

REPTON (G. S.)
[Blank volume containing about 100 inserted drawings of old English buildings and designs. *Also* Sketch-book of 93 leaves.] v.d.
Deposited on permanent loan by Mr. George S. Repton.

PORTRAIT
Nash (John). Phot. of oil painting: phot. of bust at R.I.B.A.
Presented by Messrs. E. H. Gosh.

PORTRAIT
Murray (James). Ph. print. [18—.]

MURRAY (JAMES), *architect*
London: No. 13 Kensington Palace Gardens. 1853.
Industrial dwellings, the Mall, Kensington.
Shop building, Conduit Street.
Palace Hotel, Buckingham Gate.
Custom House, Folkestone.
—Phots. of water-colour drawings. [18—.]

HOUSES OF PARLIAMENT, *London*
Clock tower. Plan, elevation, sections. Pencil D. [18—.]

MURRAY (JAMES), *del.*
Sketches of buildings and details, chiefly in Italy, also in Athens, Germany, and Belgium.
124 sheets on 107 mounts. Pencil and wash D. [18—.]

MEDAL

HOUSES OF PARLIAMENT, 1837–47
Sir C. Barry, architect.
—*All presented by Miss J. E. Murray and Mrs. Knollys.*

Notes

THE SILVER JUBILEE OF HIS MAJESTY THE KING

The Secretary has received the following letter in connection with the Jubilee Address to H.M. The King:—

Home Office, Whitehall, 7 May 1935.

SIR,—I am directed by the Secretary of State to say that he has been commanded by The King to convey to you His Majesty's thanks for the loyal and dutiful Address from the Royal Institute of British Architects on the completion of the Twenty-fifth Year of His Majesty's Reign and to assure you that His Majesty deeply appreciates the sentiments of loyalty and affection to which it gives expression.

The King was graciously pleased to express his admiration of the artistic beauty of the Address.—I am, Sir, Your obedient Servant,

H. A. STRUTT.

The Secretary,
The Royal Institute of British Architects.

PRESIDENT'S ENGAGEMENTS

The President attended the Guildhall Ball on 22 May and a reception at the County Hall on 31 May. He will attend a conversazione at the Institution of Civil Engineers on 12 June.

VICE-PRESIDENT'S ENGAGEMENTS

Mr. Ansell will attend the dinner of the Merchant Taylors' Company on 24 June and represent the President.

Mr. Maurice E. Webb attended a dinner given by the Lord Mayor and Lady Mayoress at the Mansion House on 21 May and represented the President.

INTERNATIONAL HOUSING CONGRESS, PRAGUE, 23–26 JUNE 1935

At the Congress organised by the International Housing Association (Frankfort a/M.) a number of extremely important lectures will be given by leading technical experts.

On the subject of Slum Clearance, which is the most important topic of the Congress, the following will speak:—

Miss Elizabeth E. Halton, London: "The Effects of English Legislation in Slum Clearance."

Arie Keppler, Head of Building Department, Amsterdam: "Slum Clearance and Rehousing."

Stadtrat R. Niemeyer, President "Deutsche Akademie für Städtebau, Reichs- und Landesplanung," Frankfort a/M.: "Suggestions for a Slum Clearance Act in Germany."

On general questions connected with housing, lectures will be given by the following:—

Senator Dr. F. M. Wibaut, Amsterdam: "On Present Housing Conditions in Various Countries."

Mr. Ernest J. Bohn, President of the National Association of Housing Officials, Chicago: "Housing Conditions in America To-day and the Most Recent Measures Taken."

On the equipment and fittings for small dwellings the following lectures will be given:—

Dir. F. C. Boldsen, Københavns Almindelige Boligselskab, Kopenhagen: "Plans for Small Dwellings, from the Point of View of the Housing Societies."

Dipl. Ing. M. Dudryk, Warszawa: "Sanitary Equipment in Small Dwellings in Different Countries. A Comparison."

Dr. Hynek Kubišta, Head of a Department in the Ministry of Social Welfare, Praha: "Small Dwellings in the Republic of Czechoslovakia."

Monsieur H. Lods, architect, Paris: "The Technical Equipment and Arrangements in Houses in Drancy."

The question of transplantation and rehousing will be dealt with by:—

Dr. Ing. Otakar Fierlinger, lecturer, Obersektionsrat in the Ministry for Public Works, and vice-president in the Town Planning Institute of the Academy Masaryk, Praha: "The Settling of People Outside the Towns in Czechoslovakia."

Dr. Stöckle, former Lord Mayor, Deutscher Gemeindetag, Berlin: "The Transplantation of Settlers in Germany."

Ministerialrat Dr. Zichardt, Chief of the Department "für Wohnbauförderung u.d. Bundes Wohn- u. Siedlungsamtes im Bundesministerium für soziale Verwaltung," Vienna: "Emergency Settlements in Austria."

In addition to these, large number of reports are to hand, which will be published in the form of large volumes with many pictures and presented to each delegate.

Further information and the detailed programme can be had on application to the secretariat of the International Housing Association, Frankfurt a/M., Hansa-Allee 27.

DESIGN AND INDUSTRIES ASSOCIATION

WEEK-END CONFERENCE AT BRISTOL

Friday, 5 July—Monday, 8 July

At a recent meeting of the Council of the Association it was decided to hold week-end conferences in the Provinces and that at least one of these Conferences should be held in the centre of a Branch or Local Group of the Association.

The first of these Conferences will be held in Bristol in July in co-operation with the Bristol Group.

The provisional programme is as follows:—

Friday, 5 July.	Arrive at Bristol. Informal Dinner followed by Discussion.
Saturday, 6 July.	Morning. Visit to Avonmouth Docks, etc.
	Afternoon. Free.
	5 p.m. Meeting of the Council of Association.
	8 p.m. Lecture by Mr. J. E. Barton, M.A.
Sunday, 7 July.	Motor Tour in surrounding country, including visit to Bath.
	Tea in the Pump Room.

Approximate cost, including all meals and the motor tour, £3 10s. Will members wishing to attend the Conference please write to the Secretary, Miss M. E. Pheysey, D.I.A., 6 Queen Square, W.C.1.

ROME SCHOLARSHIP IN ARCHITECTURE

Exhibition of Final Competition Designs

The designs submitted in the Final Competition for the Rome Scholarship in Architecture will be on exhibition at the R.I.B.A. between the hours of 10 a.m. and 8 p.m. (Saturday 10 a.m. and 5 p.m.) from 17 to 22 June 1935, inclusive.

The Scholarship is provided by the R.I.B.A., which makes a grant of £750 a year to the British School at Rome. It is awarded by the Faculty of Architecture of the British School at Rome.

This year the subject of the competition was "A Double Library and Lecture Halls for a University." Eleven students, drawn from the following Schools, took part:—

The School of Architecture, Edinburgh College of Art; The Liverpool School of Architecture, University of Liverpool; The School of Architecture, The Architectural Association, London; The Bartlett School of Architecture, University of London; The School of Architecture, University of Manchester; The Armstrong College School of Architecture (University of Durham), Newcastle-upon-Tyne.

EXHIBITION OF ARCHITECTS' WORKING DRAWINGS

Special Students' Evening

An Exhibition of Architects' Working Drawings will be held at the R.I.B.A. from Monday, 24 June, to Saturday, 29 June 1935, inclusive.

The Exhibition will be open daily between the hours of 10 a.m. and 8 p.m. (Saturday 5 p.m.). It will include drawings lent by:—

Mr. John L. Denman [*F.*] (Rickmansworth Girls' School).

Messrs. Harry S. Fairhurst and Son [*F.A.*] (Manchester Building for Messrs. Rylands and Sons).

Professor W. G. Newton [*F.*] (Merchant Taylors' School).

Mr. R. H. Uren [*A.*] (Hornsey Town Hall).

Mr. Wells Coates, Ph.D. (Lawn Road Flats, Hampstead).

The Exhibition will contain the drawings that a practising architect hands to a contractor, and some very comprehensive sets will be shown. A good idea will be given of the volume of work which must be done by an architect's office to produce a building.

A special Students' Evening will be held at the Exhibition on Thursday, 27 June, at 8 p.m. All students are cordially invited to attend. It is hoped that the architects (or their representatives) who have lent exhibits will be present in order to explain the drawings to the students. Refreshments will be provided, and no cards of admission are required.

R.I.B.A. HOUSTON MAINTENANCE SCHOLARSHIPS

Special attention is called to the fact that the R.I.B.A. offer for award in July 1935, in addition to the R.I.B.A. Maintenance Scholarship of a maximum value of £100 per annum, two Houston Maintenance Scholarships of the maximum value of £100 per annum each.

The Houston Maintenance Scholarships are for the purpose of providing educational and maintenance allowances for the sons of architects and artists who may be, or at the time of their death were, in impecunious circumstances, whether such architects or artists are alive or dead.

Particulars and forms of application may be obtained on application to the Secretary to the Board of Architectural Education of the R.I.B.A., 66 Portland Place, London, W.1. The closing date for the receipt of applications, duly completed, is 17 June.

NOTES FROM THE MINUTES OF THE COUNCIL

13 May 1935

The R.I.B.A. Statutory Examination for District Surveyors, May 1935

The recommendation of the Board of Architectural Education with regard to the results of the above examination was approved.

The R.I.B.A. Examination for Building Surveyors, May 1935

The recommendation of the Board of Architectural Education with regard to the results of the above examination was approved.

Mr. J. Alfred Gotch (Past-President)

The sincere sympathy of the Council was conveyed to Mr. J. Alfred Gotch (Past-President) in connection with his recent illness, together with their best wishes for his speedy recovery.

Ancient Monuments Board for England

Sir Banister (Flight) Fletcher (Past-President) was re-appointed as the R.I.B.A. representative on the Ancient Monuments Board for England for a further period of five years.

The Twenty-first Annual Conference of the National Association for the Prevention of Tuberculosis, Southport

Mr. Albert Schofield [*F.*] was appointed as the R.I.B.A. delegate to the above Conference.

Appointment of Representatives on British Standards Institution Committees

Mr. Francis R. Taylor [*L.*] was appointed to represent the R.I.B.A. on the B.S.I. Technical Committee B/31, Mortars.

Mr. Alister G. MacDonald [*A.*] was appointed to represent the R.I.B.A. on the B.S.I. Technical Committee B/26, Acoustical Terms and Definitions.

Mr. H. Ingham Ashworth [*A.*] was appointed to represent the R.I.B.A. on the B.S.I. Sub-Committee ME 34/4, Heating Boilers, which is considering the preparation of British Standard Specifications for Central Heating and Hot Water Supply Boilers.

Mr. O. P. Bernard [*L.*] was appointed to represent the R.I.B.A. on the B.S.I. Technical Committee B/33, Rubber Flooring.

Mr. S. Pointon Taylor [*F.*] was appointed to represent the R.I.B.A. on the B.S.I. Technical Committee B/5, Slates and Tiles, in place of Mr. Edwin Gunn, who had found it necessary to resign therefrom.

Mr. A. H. Barnes [*F.*] was appointed to represent the R.I.B.A. on the B.S.I. Technical Committee B/2, Asphalt for Roofing, and Sub-Committee B/2/1, Asphalt for Roofing (Drafting) in place of Mr. Edwin Gunn.

R.I.B.A. Architecture Medals: Western Australia

Lieut.-Gen. Sir Talbot Hobbs [*F.*] was appointed as the R.I.B.A. representative on the Jury set up to make the award for the R.I.B.A. Architecture Medal for Western Australia.

Advisory Committee on the Amendment of the London Building Act, 1930

The cordial thanks of the Council were conveyed to Mr. Louis Blanc [*L.*] for his valuable services as the R.I.B.A. representative on the Advisory Committee on the Amendment of the London Building Act, 1930.

The London Building Act and the Town Planning Act

It was decided to set up a Joint Committee of representatives of the London Building Act Committee and the Town Planning and Housing Committee to consider the administration of the London Building Act and the Town Planning Act with a view to the simplification of procedure and the expediting of consents to build in the London Area.

Special Committee on Official Architecture

The report of the Chairman of the Special Committee on Official Architecture was approved for circulation to Local Authorities and publication in the Journal and professional Press.

Fourteenth International Housing and Town Planning Congress London, 1935

It was decided to give a donation of £10 10s. towards the funds of the above Congress.

The Congress will be held in the R.I.B.A. Building which the Council have placed at the disposal of the Congress Committee.

MEMBERSHIP

The following members were elected:—

As Hon. Corresponding Member	1
As Fellows	8
As Associates	11
As Licentiates	8

Election, 24 June 1935.—Applications for membership were approved as follows:—

As Fellows	9 applications
As Associates	11 ,,
As Licentiates	9 ,,

Reinstatements.—The following ex-members were reinstated:—

As Associate: Leslie Hamilton Kearne.

As Licentiates: John Anderson [Retired Licentiate].
Edward Stockwell.

Resignations.—The following resignations were accepted with regret:—

Henry Booth [*L.*].
Joseph Thomas Lawrence [*L.*].

Transfer to the Retired Members Class.—The following members were transferred to the Retired Members Class:—

As Retired Fellows: Henry Bragg.
Joseph Crouch.
John Cubbon.
William Bruce Dawson.

As Retired Associate: Henry Ross.

As Licentiates: James George Chignell.
Frederick Candy Wren.

Allied Societies

THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND

A meeting of the Council of the above body was held at 8 Merrion Square, Dublin, on 10 May 1935. The President, Mr. H. Allberry, occupied the chair, and there were also present:—Messrs. J. V. Downes, E. A. Barrett, H. V. Millar, F. G. Hicks, L. F. Giron, Edwin Bradbury, J. J. Robinson, C. A. Harrington, W. H. Howard Cooke, Frederick Hayes, G. F. Beckett, T. F. Strahan, Professor R. M. Butler and Mr. R. C. Keefe (Hon. Secretary).

Correspondence from the Department of Local Government, Dublin and District House Builders' Association and the Civics Institute were read. It was decided to grant the use of the Institute rooms to the Civics Institute for their General Meeting on 27 May.

The Hon. Secretary was directed to make the preliminary arrangements with the Master Builders' Association in connection with a proposed deputation to the Department of Local Government and Public Health on the question of Divided Contracts.

The Code of Professional Conduct as amended at the last General Meeting was approved by the Council and its circulation amongst the members was directed.

Reciprocal action between the Institute and the Royal Society of Ulster Architects which has engaged the attention of the last Council was discussed and the President, Mr. G. F. Beckett, and Mr. J. J. Robinson were elected to represent the Institute in any conference with the latter body which may ensue.

The Hon. Secretary of the Board of Architectural Education, Mr. W. H. Howard Cooke, reported that the Assessors appointed to examine the designs submitted for the Institute Travelling Scholarship recommended that the prize should be awarded to Mr. Basil R. Boyd Barrett, and this recommendation was confirmed. The drawings submitted by Messrs. J. A. Delany, C. J. Crowe and N. R. MacGovern were placed second, third and fourth respectively.

The President stated that the Statutory General Meeting fixed for 6 June should be postponed to 4.30 p.m. on 27 June, owing to pressure of work consequent on the annual examinations.

ROYAL INCORPORATION OF ARCHITECTS IN SCOTLAND

AWARD OF PRIZES

In connection with the prize schemes of the Royal Incorporation of Architects in Scotland for session 1934–35 the following awards have been made: (1) *Rowand Anderson Studentship* (£100 and Silver medal), Mr. P. H. B. Ronaldson, Edinburgh College of Art; (2) *Rutland Prize* (£50)—1st prize, Mr. J. N. Pollock, Edinburgh College of Art; 2nd equal, £10 each, Messrs. R. W. Johnston and F. Morrison, both of the Edinburgh College of Art; (3) *Incorporation Prize* (£15), Mr. W. A. B. Robertson, Edinburgh College of Art, while Mr. G. B. Biggar, Glasgow School of Architecture, received "Honourable Mention"; and (4) *Lorimer Memorial Prize* (£10), Mr. W. T. C. Walker, Edinburgh College of Art. The Quarterly Essay Competition prizes, p. £15 and £5, are still to be awarded.

At the monthly meeting of the Council of the Royal Incorporation of Architects in Scotland, held at 15 Rutland Square, Edinburgh, Mr. Wm. B. Whitie, F.R.I.B.A., President, in the chair, it was reported that all arrangements had now been completed for the joint conference of the Royal Incorporation and the R.I.B.A. to be held in Glasgow from 19 to 22 June. Standing Committees for year 1935–36 were elected. The first prize, p. £15, in Quarterly Essay Competition, was awarded to Mr. H. A. Rendel Govan, Edinburgh College of Art, while second prize, p. £5, was awarded to Mr. T. O. W. Gratton, Glasgow School of Architecture. The following Members were elected:—Mr. J. P. Goodsir, L.R.I.B.A., Edinburgh, as *Fellow*; and Messrs. W. M. Guild, Cupar, James Robertson, Edinburgh, T. S. Cordiner, Glasgow, and D. A. Fowler, A.R.I.B.A., Inverness, as *Associates*.

THE BIRMINGHAM AND FIVE COUNTIES ARCHITECTURAL ASSOCIATION

At the eleventh meeting of the session held in the Galleries of the Royal Birmingham Society of Artists on Friday, 12 April, Mr. W. T. Benslyn [*F.*] occupied the chair and a paper was read by Mr. H. G. Wicks [*A.*] on the visit last Whitsuntide by members of the Association to Caudebec en Caux.

After giving a brief outline of the history of the town the lecturer recalled various incidents of the excursion, among them the serious fire which occurred during their visit and resulted in the destruction of several picturesque houses in the Rue de la Boucherie. The paper was illustrated by a number of sketches made by the members, and by lantern slides.

The twelfth and concluding meeting of the current session took the form of a visit on Friday, 3 May, to the Birmingham Hospital Centre. This is now in course of erection at Metchley Park adjoining the Birmingham University, where the members with their President, Mr. W. T. Benslyn [*F.*], were met by Mr. T. A. Lodge [*F.*], of the firm of Messrs. Lanchester and Lodge, the architects of the hospital, and by Mr. Lovatt, of Messrs. Wilson Lovatt and Sons, Ltd., the contractors.

After spending some time in the examination of the working drawings the members were conducted over the buildings. These are in various stages of completion, the more advanced being the nurses' block, the administrative block, and the laundry and power house, and the visitors were much interested in observing the successful way in which the many problems presented in the construction of so large a hospital are being solved.

At the conclusion of the visit the members of the Association, through their President, thanked Mr. Lodge for coming down from London specially to meet them, and for his kindness in conducting them over the buildings.

Notices

THE TENTH GENERAL MEETING, MONDAY, 24 JUNE 1935, AT 8 P.M.

The Tenth General Meeting of the Session 1934-1935 will be held on Monday, 24 June 1935, at 8 p.m., for the following purposes:—

To read the Minutes of the Annual General Meeting held on Monday, 13 May 1935; formally to admit members attending for the first time since their election.

To read the report of the Scrutineers appointed to examine the voting papers for the election of the Council and Standing Committees for the Session 1935–1936.

Mr. Philip J. Turner, F.R.A.I.C. [*F.*], Past President of the Quebec Association of Architects, to present to Sir Raymond Unwin, Hon.LL.D., Past President R.I.B.A., the Diploma of the Royal Architectural Institute of Canada.

INFORMAL DISCUSSION ON MATTERS OF PROFESSIONAL INTEREST

At the conclusion of the above General Meeting there will be an informal and private discussion on matters of current professional interest or concern. Members are invited to bring up for discussion, with or without notice, subjects of professional interest or difficulty.

BRITISH ARCHITECTS' CONFERENCE, GLASGOW, 19–22 JUNE 1935

Final arrangements for all the events of the Conference are now being made. It is hoped that all members and students who have not already done so will at once refer to the programme sent to them with the issue of the JOURNAL for 27 April and send in their names without delay for such of the events as they desire to take part in.

Members of the R.I.B.A. and the Allied and Associated Societies who are officials of local authorities will be cordially welcomed as delegates to the Conference.

Travelling Facilities

The railway companies in Great Britain and the Irish Free State have agreed to issue return tickets to Glasgow at a reduced rate, namely, the ordinary single fare and one-third for the double journey, to members and their friends who attend the Conference.

Members who desire to take advantage of this special reduced fare concession must present at the booking office a signed voucher to be previously obtained from the Secretary R.I.B.A.

Conference Exhibition

Since the publication of the preliminary programme of the Conference, details have been received regarding an exhibition which it is proposed to arrange in connection with the Conference. The exhibition, which will consist of photographs, will illustrate architectural development in the area of the Glasgow Institute of Architects during the last century and will show the progress made in this district towards a manner of architecture expressive of the tendencies of the time in Scotland.

LEGAL ADVICE FOR MEMBERS OF THE R.I.B.A.

The Practice Standing Committee, with the approval and authority of the Council, have made arrangements with an experienced solicitor whereby members of the R.I.B.A. can obtain legal advice for a very moderate fee on matters which arise in their practice from time to time.

The following arrangements have been made:—

A member desiring advice as to his legal position should in the first instance communicate his inquiry to the Hon. Secretary of the Practice Standing Committee, together with the relative documents. Should the matter raise a question of general interest to the profession the Committee would obtain the opinion and forward it to the member. In other cases the member would be put in communication with the solicitor, who would advise him direct.

In matters of general interest the solicitor's fee would be borne equally by the R.I.B.A. and the member concerned, and in other cases the fee would be borne wholly by the member. The fee would in either case be limited to a fixed amount. The advice would normally be confined to an opinion on the documents, but in cases where an interview between the member and the solicitor would be desirable, this would be arranged without extra fee.

Particulars as to the fee chargeable may be obtained on application to the Secretary R.I.B.A.

1931 FORM OF CONTRACT AND INSURANCES

The attention of members is drawn to the fact that Clause 16 of the 1931 Form of Contract does not indemnify the employer against injuries to persons as a result of any act or negligence on the part of the employer or his servants, nor can the contractor be held liable for any damage to property due to circumstances not within his control.

The Practice Standing Committee, therefore, in informing members of this position, would urge upon them the importance of drawing the attention of their clients to the matter each time a contract is entered into, in order that the necessary steps may be taken to insure against such contingencies.

PAYMENT FOR ADDITIONAL USE OF PARTY WALL UNDER THE LONDON BUILDING ACT

The Practice Standing Committee have recently obtained an opinion from the Institute Solicitor upon Section 120 of the London Building Act 1930.

The question upon which an opinion was desired was the basis upon which is to be assessed the payment to be made by an adjoining owner for the use for the first time of a portion of a party wall built some years ago by the then building owner but not used by the then adjoining owner until now.

The Institute Solicitor has given his opinion that an award made by the late Mr. John Slater under Section 91 of the Act of 1894, to the effect that payment should be based upon the cost of the party wall at the date when it was built, was a correct interpretation of the law and that this award would be valid and good in law under Section 120 of the Act of 1930.

ARCHITECTS' AND SURVEYORS' FEES IN CLAIMS UNDER FIRE INSURANCE POLICIES

The Practice Standing Committee of the R.I.B.A., in conjunction with representatives of the Chartered Surveyors' Institution, have had under consideration the question of professional fees in connection with reinstatements after fire.

No difficulty arises in connection with a fire in a building in course of erection because the building contract provides for such occurrences. It is in connection with a fire in an existing building that difficulties are likely to arise, owing to the policy being frequently indefinite in its terms. The ordinary insurer of a building in many cases does not realise that, although the services of an architect and a quantity surveyor and sometimes a clerk of works are normally essential to a rebuilding owner, unless he is specifically covered against these fees they do not form part of the Insurance company's liability for payment in the case of partial or complete destruction of the building; and in many cases the insurer is not aware of this until it is too late.

In the interests of both themselves and their clients members are advised to take every possible step to ensure that fees for professional services are specifically covered in fire insurance policies.

ARCHITECTURAL COMPETITIONS

Assessors' Awards

All architects who take part in architectural competitions are reminded by the Council of the R.I.B.A. that participation in a competition is a definite acceptance of the principle that the award of the assessor is final and binding upon themselves as well as upon the promoters, and that any competitor who feels that he has real ground for dissatisfaction with an assessor's award should communicate with the Secretary of the R.I.B.A.

Further, all architects, whether competitors or otherwise, are reminded that discussion of correspondence in the public or professional Press which tends to criticism or disparagement of an assessor or award cannot alter the final and binding effect of the award, but may prejudice architects and the whole competition system in the opinion of the public, and is, therefore, highly undesirable.

NEW BUILDING MATERIALS AND PREPARATIONS

The Science Standing Committee wish to draw attention to the fact that information in the records of the Building Research Station, Garston, Watford, is freely available to any member of the architectural profession, and suggest that architects would be well advised, when considering the use of new materials and preparations of which they have had no previous experience, to apply to the Director for any information he can impart regarding their properties and application.

THE NATIONAL ASSOCIATION OF WATER USERS

Members are reminded that the National Association of Water Users, on which the R.I.B.A. is represented, exists for the purpose of protecting the interests of consumers.

Members who experience difficulties with water companies, etc., in connection with fittings are recommended to seek the advice of the Association. The address of the Association is 46 Cannon Street, London, E.C.4.

OVERSEAS APPOINTMENTS

When members are contemplating applying for appointments overseas they are recommended to communicate with the Secretary R.I.B.A., who will supply them with any available information respecting conditions of employment, cost of living, climatic conditions, etc.

Competitions

The Council and Competitions Committee wish to remind members and members of Allied Societies that it is their duty to refuse to take part in competitions unless the conditions are in conformity with the R.I.B.A. Regulations for the Conduct of Architectural Competitions and have been approved by the Institute.

While, in the case of small limited private competitions, modifications of the R.I.B.A. Regulations may be approved, it is the duty of members who are asked to take part in a limited competition to notify the Secretary of the R.I.B.A. immediately, submitting particulars of the competition. This requirement now forms part of the Code of Professional Practice in which it is ruled that a formal invitation to two or more architects to prepare designs in competition for the same project is deemed a limited competition.

BIRMINGHAM: NEW MUNICIPAL OFFICES

The General Purposes Committee of the City of Birmingham invite architects of British nationality and practising in the British Isles to submit, in competition, designs for new Municipal Offices.

Assessor: Sir Reginald Blomfield, R.A., F.S.A.
Premiums: £1,000, £600, £400 and £250.
Last day for receiving designs: 28 June 1935.
Last day for questions: 30 March 1935.

CHEADLE: NEW COUNCIL CHAMBER AND OFFICES

The Cheadle Rural District Council invite Registered Architects residing or practising in the County of Stafford to submit, in competition, designs for new Council Chamber and Offices to be erected at Greenhill, Cheadle.

Assessor: Mr. Ernest C. Bewlay [*F.*].
Premiums: £100, £70 and £30.
Last day for receiving designs: 30 June 1935.
Conditions may be obtained on application to Mr. F. S. Cox, Clerk to the Cheadle Rural District Council, Cheadle, Stoke-on-Trent. Deposit £2 2s.

GLASGOW: FOUR-APARTMENT COTTAGE

In connection with the Housing and Health Exhibition to be held in the Kelvin Hall in October, the Glasgow Corporation invite architects in Scotland to submit, in competition, designs for a four-apartment, semi-detached cottage.

Assessors: Mr. G. Gardner M'Lean [*L.*].
Mr. W. B. M'Nab, Director of Housing.
Mr. J. H. Ferrie [*L.*].
Premiums: £100, £75, £50 and £25.
Last day for sending in designs: 14 June 1935.
Conditions of the competition may be obtained on application to The Manager, Kelvin Hall, Glasgow.

HERTFORD: NEW CENTRAL COUNTY BUILDINGS

The Hertfordshire County Council invite architects to submit, in competition, designs for new Central County Buildings to be erected at Hertford.

Assessor: Mr. Robert Atkinson [*F.*].
Premiums: £350, £250 and £150.
Last day for receiving designs: 1 October 1935.
Last day for questions: 1 July 1935.
Conditions may be obtained on application to The Clerk of the County Council, Clerk of the Peace Office, Hertford. Deposit £2 2s.

KENDAL, WESTMORLAND: NEW COUNTY OFFICES

The Westmorland County Council invite architects of British nationality and practising in the British Isles to submit, in competition, designs for new County Offices to be erected at Kendal.

Assessor: Mr. G. H. Foggitt [*F.*].
Premiums: £200, £125 and £75.
Last day for receiving designs: 4 July 1935.
Last day for questions: 2 May 1935.

ROMFORD: NEW MUNICIPAL OFFICES

The Romford Urban District Council invite architects of British nationality and practising in the British Isles to submit, in competition, designs for new Municipal Offices at Romford.

Assessor: Mr. Kenneth M. B. Cross, M.A. [*F.*].
Premiums: £250, £100 and £50.
Last day for submitting designs: 29 June 1935.
Last day for questions: 30 April 1935.

SWINDON: NEW MUNICIPAL OFFICES

The Corporation of Swindon invite architects of British nationality and resident in the British Isles to submit, in competition, designs for new Municipal Offices.

Assessor: Prof. A. B. Knapp-Fisher [*F.*].
Premiums: £350, £250 and £150.
Last day for receiving designs: 31 August 1935.
Last day for questions: 25 May 1935.

Conditions of the competition may be obtained on application to the Town Clerk, Town Hall, Swindon. Deposit £1 1s.

YORK: NEW MUNICIPAL OFFICES, CLINICS, ETC.

The Corporation of York invite architects of British nationality and domiciled in the United Kingdom to submit, in competition, designs for new Municipal Offices, Clinics, etc.

Assessor: Mr. Henry V. Ashley [*F.*].
Premiums: £250, £150, £100 and £50.
Last day for receiving designs: 1 November 1935.
Last day for questions: 29 July 1935.

Conditions of the competition may be obtained on application to Mr. Reginald Anderson, Town Clerk, Guildhall, York. Deposit £1 1s.

COMPETITION RESULTS

COVENTRY: COVENTRY AND WARWICKSHIRE HOSPITAL ALTERATIONS AND EXTENSIONS

1. Messrs. Armstrong and Gardner [*F.* and *A.*] (Warwick).
2. Messrs. W. A. Pite, Son and Fairweather [*FF.*] (London).

CROYDON: DEVELOPMENT SCHEME

1. Messrs. R. J. O'Donoghue [*F.*] and F. W. Halfhide [*A.*] (London).
2. Messrs. C. R. Crickmay [*A.*] and J. F. M. Schreiner (London).
3. Mr. E. P. Mawson [*F.*] (Lancaster).
4. Mr. Gilbert H. Jenkins [*F.*] (London).

CUDDESDON COLLEGE, OXFORD: NEW CHAPEL

1. Mr. H. S. Goodhart-Rendel [*F.*] (London).

Members' Column

PARTNERSHIP WANTED

A.R.I.B.A. University Graduate (1st Class Hons. B.Arch. Liverpool) seeks partnership. Has had experience in good offices in England and the United States, and in the preparation of competition drawings. Is young, has travelled widely, and has special qualifications in design, including the Rome Scholarship and the Victory Prize of the R.I.B.A. Box No. 2255, c/o Secretary R.I.B.A.

ARCHITECT'S LIBRARY

Architect's library for sale at less than half the cost or prices in recent catalogues of second-hand books. Also a collection of many thousands of architectural and cognate prints and photographs of ancient and modern work, arranged and classified in 37 large portfolios. May be inspected in London before 16 June. Complete lists will be sent to likely buyers on application.—Box No. 2555, c/o Secretary R.I.B.A.

NEW PARTNERSHIP

Mr. R. Mervyn Noad [*A.*] has assumed into partnership Mr. Alastair F. Wallace [*A.*] with whom he has been associated in business for the last few years. The new firm will be known as R. Mervyn Noad & Wallace, AA.R.I.B.A., and the practice will be carried on at the present address, 261 West George Street, Glasgow, C.2.

CHANGE OF OFFICE

Mr. L. W. Thornton White, A.R.I.B.A., chartered and registered architect, has moved his office to 7 Bedford Square, W.C.1. Telephone: Museum 7851.

NEW ADDRESS

Mr. C. Yelverton Dawbarn [*A.*] is now in practice at 21 Dale Street, Liverpool 2. He would be glad to receive trade catalogues.

A.B.S. Insurance Department

HOUSE PURCHASE SCHEME
(For property in Great Britain only)

Important Changes

The A.B.S. Insurance Department has for some years made a special feature of negotiating loans for house purchase for architects and their clients with a leading assurance office.

The scheme has now been revised, the amount of the loan being increased to 80 per cent. and the charges of the office's surveyor and solicitor being paid by the assurance office.

Revised Terms

Amount of loan ..	80 per cent. of the value of the property as certified by the surveyor employed by the office.
Reduced rate of interest	4½ per cent. (gross).
Repayment	By means of an endowment assurance which discharges the loan at the end of 15 or 20 years or at the earlier death of the borrower.

N.B.—The office does not usually undertake loans under the terms of this prospectus on:—

(*a*) Property of which the value exceeds £2,500,
(*b*) Property of the bungalow type, or where the accommodation is of such a nature as to render the property not freely marketable,
(*c*) Property not in the sole occupation of the borrower,

but where such properties are acceptable special terms will be quoted on application.

Special Concessions to Architects

In the case of houses in course of erection, it has been arranged that provided the plan and specification have been approved by the surveyor acting for the office, ONE-HALF of the amount of the loan agreed upon will be advanced on a certificate from the office's surveyor that the walls of the house are erected and the roof on and covered in to his satisfaction.

Please write for full particulars and a quotation from the Secretary, A.B.S. Insurance Department, 66 Portland Place, W.1. Telephone: Welbeck 5721.

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